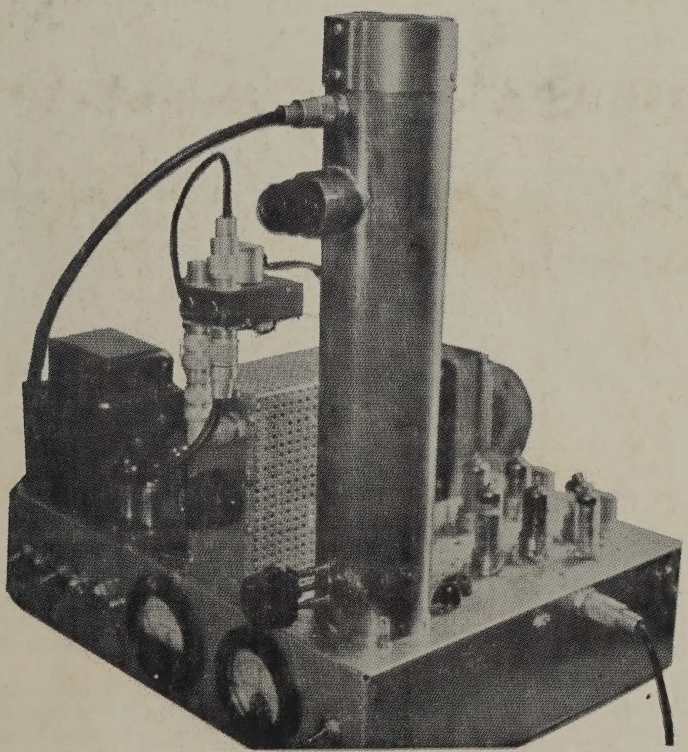
VHF HORIZONS

July 1963
40 Cents



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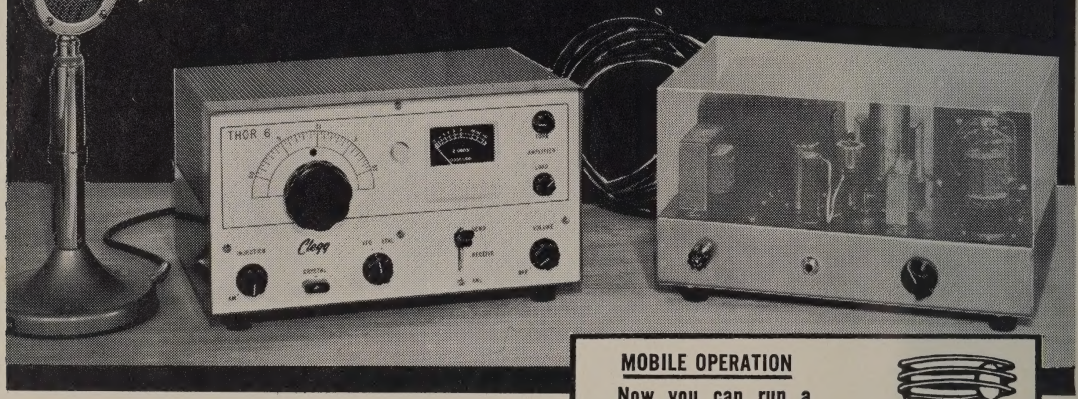

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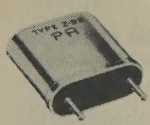

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VHF HORIZONS

VOLUME 2 — NUMBER 6
JULY, 1963

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From the Publisher's Shack

We've had a few letters of late about the apparent changes in the **VHF Horizons** operating structure and the appearance of the book.

So I thought a brief comment or two might not be out of order.

In terms of subscribers, VHF is a howling success. Lots of fellows, it seems, have been searching for a VHF only publication. And, I think we've proven that there is a fairly good storehouse of VHF-UHF news just sitting around to be printed. Most of it is first-time in print material, and very informative.

But magazines cost money. A lot of money. How much money is of little importance, except to note that it costs more to put this one out, even on a shoestring budget, than it is taking in.

This kind of situation can exist only so long. Last month we trimmed 8 pages out and cut the staff. **Now we are breaking even.** Which is all we intended to do in the first place. VHF Horizons has cost me more sweat, blood and tears than any magazine Horizons has ever put out. We still put out magazines for CB, closed circuit television, two-way public safety communications and so on. They all carry their own weight. I knew, down deep, that VHF wouldn't carry its' own weight. But I have been an ardent VHF-UHF'er from the day I first became a ham, and I also knew that my kind of amateur radio just wasn't getting its fair share in existing books.

No fault of the existing books. This is simply an age of specialization, and VHF-UHF is highly specialized. It takes one to talk to one, as it were.

So I stuck my own neck out with my stockholders and said we'll print this magazine, or I'll be more that a little hard to get along with. They retaliated with "go ahead and print it, but if it doesn't **at least** break even, **we'll be very hard to get along with.**"

And they have been.

So here is how things stand. **I'll keep VHF going forever,** now that it is a proven reader success, even if it comes out of my very own pocket, which it may. I'm a nut that way.

But I'll need the help of each and every one of you 23,000 readers, and especially the help of those fellows who haven't found it in their hearts to subscribe yet. It is subscriptions which have and will keep a journal of this stature going for VHF-UHF'ers. And this means beating the bushes on the air, and in person, each of you, for every subscription we can find.

At the present reduced overhead break even point we don't have a budget for attending ham conventions and whooping it up on behalf of VHF, and we don't have a budget for elaborate advertising promotions.

We have a budget, limited, to put out and mail a magazine. Naturally advertising does and will help. But it offsets less than 20% of the overhead presently. Any additional advertising will, I am sure, be taken as an endorsement of our product, and more important, an endorsement of VHF-UHF amateur radio in general. It seems quite reasonable to us that some of the bigger names in amateur radio manufacturing should have some sort of stake in the future of VHF-UHF. And our rates are so unbelievably low that even a full year's support with full pages every month amounts to less than $1,400 for the year. And we know that they will be buying a whole lot more good will and sales value than that!

So there you have it. I want to state in clear, pear-shaped tones that we are not in any stretch of the imagination going to cease publishing VHF, even though there have been rumors to the contrary.

Period.

I'm simply asking for your support of this medium of expression in amateur radio, if you feel that VHF Horizons has a place in your hobby and your life.

That's not too much to ask, or is it?

W5KHT

FOR THE 1215 Mc BUFF

L BAND COAXIAL WAVEMETER

K7KDU
2800 N.E. 55th
Seattle 5, Washington

Most hams who are using APX-6 type equipment on the 1215 Mc. band are likely to become a bit shifty eyed when you ask them what their frequency is. "Around 1220 mc. I think," is about as close as you'll pin them down, with an occasional "I dunno" denoting the more honest types.

Since I am allergic to Federal Investigation it became obvious when 1215 Mc was undertaken as a joint project of K7KDU-W7QID that Steve and I would have to figure out some way of measuring our frequency.

The first attempt was a set of close spaced Lecher Lines like those in the Books. The results were just about what we expected from previous experience. Sharp nulls were very difficult to find because of radiation from the lines, body and hand capacity effects, oscillator pulling because of the tight coupling required, reflections from walls, etc.

It is possible to obtain accurate frequency measurements in the L band through use of Lecher Lines if you are very careful and very patient. Here however, something better was needed. Most of our operation is portable, a fact of life that we Western Mountain boys learn to appreciate more and more as operations go higher and higher in frequency. Lecher Lines are not really designed for portable operation. A cavity or coaxial type of wavemeter was indicated and after several attempts were made, we came up with a good one.

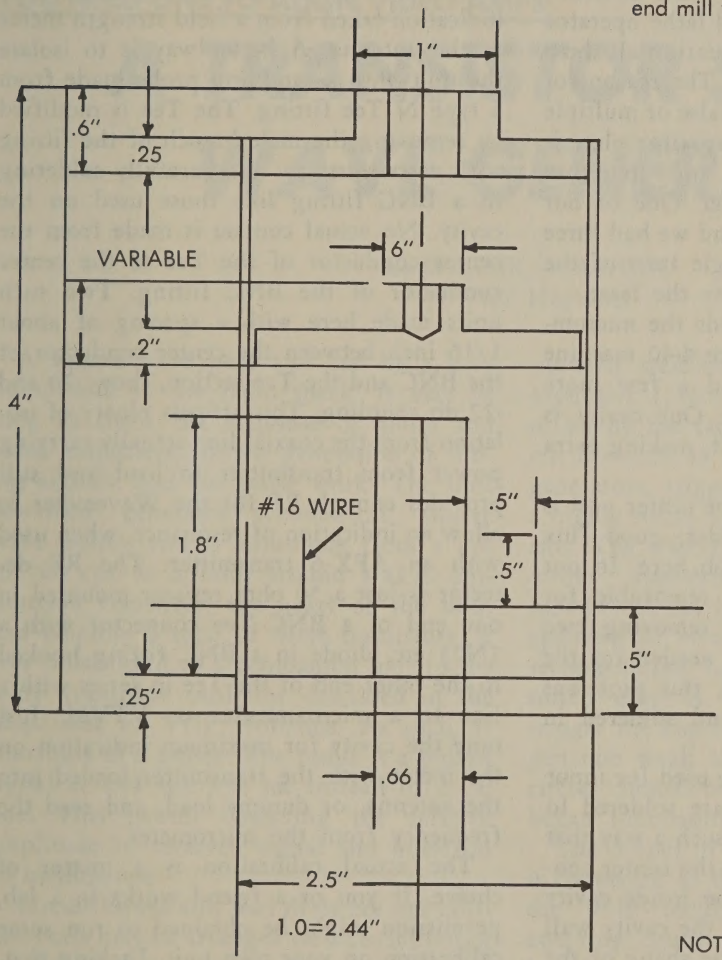
A few notes of caution are in order at this point. This wavemeter was constructed as a frequency standard and as such, great care must be exercised in its construction. If haphazard construction is practiced, the results can hardly be expected to be very precise. With this in mind, it is imperative that access to a lathe be obtained.

Physically, the wavemeter consists of a capacity loaded ¼ wave coaxial tank, with the loading capacitor driven by a micrometer from with the frequency is read. Both input and output coupling fittings are included and the wavemeter may be used as a transmission or absorbtion type with equally good results.

Initial calibration of the K7KDU-W7QID unit was with the Lecher Lines, and upon laboratory calibration, the original calibration was found to be accurate within 4 Mc. Further checks showed that the unit has a VSWR of less than 2:1 across the entire L band when used as a transmission type wavemeter terminated with 50 ohms. Loss through the filter is on the order of 1 to 2 db. depending on frequency. Frequency accuracy and resetability was less than plus-minus 1% when Fo is approached from the high frequency side on all readings.

The method used for input and output coupling is by no means the ultimate. Originally, further experiments with different coupling methods were planned. These plans have been dropped, in view of the excellent results already obtained.

Little difficulty should be encountered in the construction once you have obtained all the parts. The tuning capacitor is actually a false top for the cavity but does not contact the cavity walls. An earlier model had a contacting plunger and was very noisy The false top or capacitor late is built in such a fashion that it is firmly attached to the driven post of a 1" travel micrometer. This must be very accurately fitted. The



.5" Hole—Use spot facer or end mill with pilot.

Drill 0.235" hole .3" deep and blind.

Starret #263 1" travel mike.

Coupling probe detail #16 wire

Drill 3/8" hole for UG 109 4/U BNC coax receptacle.

NOTE: Mike mounts in .5" hole in top of cavity. Flange is equipped with two 6/32 set screws 90° opposed.

False top fastens to mike piston in same manner.

Top is fastened by three 4/40 machine screws 120° intervals. Bottom is soldered on.

hole into which the micrometer post fits should be nearly a press fit with the mic. post and must be exactly perpendicular to the inside face of the capacity plate. The **actual** top of the cavity must also be exactly perpendicular to the cavity walls and the hole in this plate that the micrometer is seated in must be exactly perpendicular to the plate. If all this seems a bit difficult, let me point out that a good lathe operator will have no difficulty in squaring all these things to a fantastic degree. The reason for the precision is to avoid the false or multiple resonances one gets if the capacitor plate is slightly "out of plumb" and therefore wobbles slightly in its travel. One of our first units had this trouble and we had three distinct resonances in a single turn of the micrometer. Confusing to say the least.

The cavity top which holds the micrometer is held in place by three 4-40 machine screws around its edge and a few more screws won't hurt a thing. Our cavity is machined for a near press fit, making extra screws unnecessary.

The cavity bottom with the center post is soldered in place. Soft solder, good flux and a torch make a neat job here. In our unit, the center post was removable for experimental purposes, by removing two screws. Once the exact size needed for the center post was established, this post was mounted with its screws and soldered in place.

UG-1094 BNC fittings are used for input and output fittings. These are soldered to the outside of the cavity in such a way that the teflon insulation around the center conductor is just flush with the inside cavity wall. If desired, the hole in the cavity wall could be threaded to take the shank of the fitting. However, we just soldered the nuts supplied with the fittings to the outside of the cavity, centered over the hole in the wall, and screwed the fitting into the nut until it was flush, as mentioned above. Another nut on the shank of the fitting was used as a jam nut to hold the fitting until coupling systems were tried and the one used was settled upon. Then the whole mess was carefully soldered in place. A note here is in order. Do not attempt to use other than Teflon insulated jacks here if you plan on doing any soldering. Poly melts! Type N fittings could also be used but do not use the garden variety UHF fittings unless you are willing to put up with the SWR etc., that these things cause at 1215 Mc.

To use the Wavemeter after calibration it may be inserted in the line from the transmitter to the antenna and resonance indication taken from a field strength meter at the antenna. A better way is to isolate the unit with a sampling probe made from a type N Tee fitting. The Tee is modified by removing the male branch of the fitting with a jewelers saw and carefully soldering in a BNC fitting like those used on the cavity. No actual contact is made from the center conductor of the Tee to the center conductor of the BNC fitting. Two such units made here with a spacing of about 1/16 inch between the center conductor of the BNC and the Tee section, show -20 and -22 db coupling. This affords plenty of isolation from the coaxial line actually carrying power from transmitter to load and still provides enough RF for the Wavemeter to allow an indication of resonance, when used with an APX-6 transmitter. The RF detector is just a 50 ohm resistor mounted in one end of a BNC Tee connector with a 1N25 etc. diode in a BNC fitting hooked to the other end of the Tee in series with a line to a microammeter or VTVM. Just tune the cavity for maximum indication on the meter with the transmitter loaded into the antenna, or dummy load, and read the frequency from the micrometer.

The actual calibration is a matter of choice. If you or a friend works in a lab, permission might be obtained to run some calibration on your own unit. Lacking that, the Lecher Lines will do OK, provided care is taken to avoid errors introduced by the factors previously mentioned.

You will need a variable frequency source for the L band (such as the L.O. in your APX-6) and your Lecher Lines. Couple the oscillator through your modified Tee to the Lecher Lines, set the oscillator on some frequency, measure this Frequency with your Lecher Line setup and peak your cavity wavemeter. Then record the Micrometer reading on a chart opposite the correct

Frequency. The chart and your Cavity Wavemeter are considerably more portable than those Lecher Lines and you'll probably have a lot of calls from the local 1215 Mc Ops to "Drop over and bring your wavemeter."

Much credit is due Steve, W7QID, whose professional lathework and careful attention to detail, made this Wavemeter and another one just completed for the 10 KMc band, practical and worthwhile additions to our ever growing "junkpile" of UHF gadgets.

YOU NEED ONE TO ALIGN VIDEO AMPS

A TRANSISTOR SQUARE WAVE GENERATOR

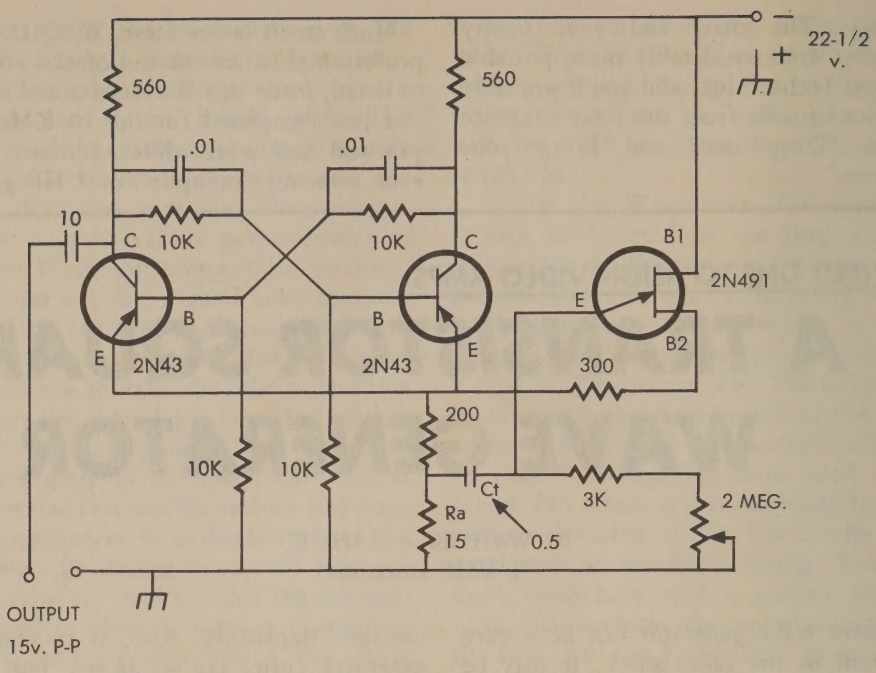
By W4HHK — A4HHK
% VHF Horizons

A square wave generator can be a very useful tool in the radio shack. It may be used to check the response of audio and video amplifiers, for the generation of timing signals, and for pulse work. The unit described generates symmetrical, square wave pulses, and is adjustable from 1 cps to 500 cps. It is built around a G.E. unijunction transistor, the heart of the unit, and employs a total of three transistors. It was constructed as a companion unit to the VHF transistor oscillator described in the May issue of VHF Horizons. As such, it functions as a pulser. The result is a pulsed signal at 144 and 432 mc instead of a cw one. This permit observing the relative amplitude of received signal and noise on an oscilloscope.

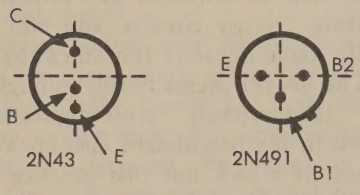
Circuit layout and lead dress are not critical. Parts may be arranged on a circuit board in the same manner as the schematic diagram. The generator could be housed in a Minibox of the same size as the VHF oscillator unit (2-1/4 x 2-1/4 x 5 in.) for the sake of uniformity. Such an enclosure would not accommodate a battery of sufficient capacity, however, as the circuit requires a total of 30 ma at 22½ volts. At this supply voltage, the pulse amplitude is approximately 15 volts (peak-to-peak).

The 2N491 unijunction transistor has electrical characteristics that are quite different from those of the conventional two-junction transistors. Also, it is somewhat expensive (price tag — $8.40), but this is offset by the fact that it greatly simplifies circuits such as sawtooth generators, pulse generators, trigger circuits, and etc. It has a highly stable negative resistance characteristic. The 2N491 seems hardly enough. The writer inadvertently cross-connected its base-two in the breadboard lash-up with no apparent ill effect, but this practice is not recommended. Luckily, the wiring error resulted only in failure of the 2N491 to trigger the flip-flop circuit, although it did generate weak sawtooth waves. When the circuit connections were corrected, the unit began functioning properly.

The output of the square wave generator is connected to the 2N2398 output stage of the VHF oscillator through a 10 mfd. coupling condenser. Also, the two circuit board grounds should be connected. Insufficient coupling capacity will result in distortion of the pulses. In the VHF oscillator unit the -22½ v. lead connecting to the 5.1 k resistor feeding the 2N2398 collector circuit is broken, and the pulses from the square wave generator are fed through the 5.1 k resistor. Increasing the capacity of Ct will decrease the frequency of the pulses. Frequencies up to 100 kc may be generated by proper choice of Ct and Ra and suitable flip-flop design. The 2N384 oscillator runs continuously from its own 22½ v. battery



BASE DIAGRAMS



NOTES:
All capacitors in mfd. and rated at min. of 25 vdc.
All resistors in ohms, ½ watt.
2N43 is PNP type. 2N525 may be substituted for 2N43, but base diagram is different.

when the output stage is pulsed. A separate battery or power supply powers the square wave generator.

References:
G.E. Transistor Manual, Fifth Edition
Pulsed, Crystal-Controlled Signal Generator, A. McFarland, QST, March, 1961.
Selected Semiconductor Circuits Handbook, MIL-HDBK-215.

Letters

Editor:

Appreciate your recent card advising the new late production date for VHF. I like your magazine so far, but cannot say I appreciate the late mailing date summer or otherwise. I'd like to get both my monthly publications, QST and VHF the first week of the month.

W0BAG

OM:

We changed the mailing date to give better service. With the June issue, we should have achieved this mecca.

Dear VHF:

Well, I finally finished persuing your latest issue and decided to drop you a line. I'm not an exclusive VHF'er, nor do I subsist on HF activity. Your magazine is pretty good, especially the technical articles. However, 40 cents is rather steep. Any chance of getting back issues?

Martin J. Feeney, Jr.
K1OYB
Portland, Maine

Martin:

40 cents may be steep. But its exactly what it costs us to put the book out. We're out of all back issues but April, 1963 (our pressman forgot to stop at 24,500 copies). However, we plan to run a "Best of VHF" annual late this summer which will sell for about two bucks, and contain the original scripts of the most highly rated articles to appear in VHF in the past year. We're open to comments from readers who would like to have such a handbook.

Editor

1963 SEPTEMBER 1963						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
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15	16	17	18	19	20	21
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(annual)

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PROGRESSIVE 5894 TRANSMITTER

FRANK L. GRIFFIN,
WB6AOW

Some months ago, I wrote your Editor, and told him I had completed a 5894 RF unit for Two Meters. In his reply he stated that he was interested and to write it up. Well, before I got around to writing up the unit I traded it off. This left me with any working details, as I build from impulse, not schematics, so there was nothing from which to work.

Now, many months later, and after much thinking I am fulfilling the promise.

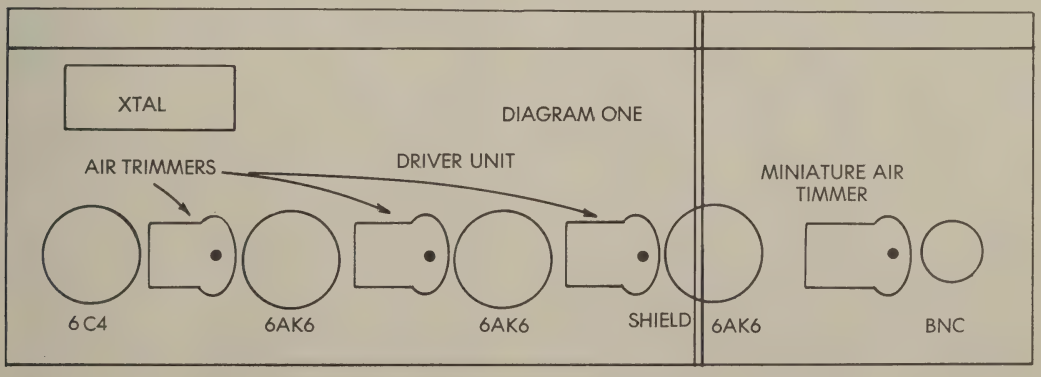
At the time of the original construction I spent quite a few dollars and a good many hours in completing the RF unit. Having a chance to reminisce about the original unit, I came to several conclusions that would not be accepted by the average constructor. The first being the material cost. Each week during construction the major portion of my allowance went into parts without any RF coming out. If it had not been for other projects to fill my time and the desire to complete the unit it would have given up before completion. Secondly, some of the circuitry was tricky and could cause problems. The other reasons were minor, but had a factor in the redesign of the presented unit.

The redesign and packaging was brought about through the need of a bench driver test transmitter. It seemed I was constantly disconnecting the driver from my operating rig. What I needed was low drive for tubes like 6360's etc., and higher drive for 4X150's etc.

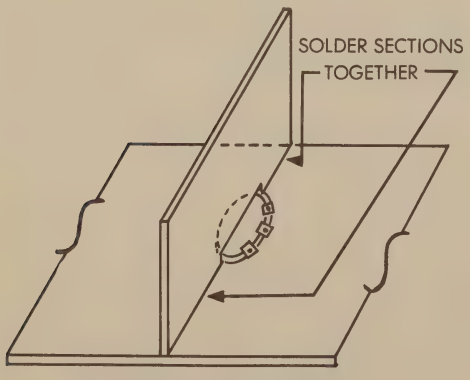
CIRCUIT DISCRIPTION

The complete transmitter uses six tubes, these are: a 6C4 oscillator, a 6AK4 tripler, a 6AK6 doubler, a 6AK6 144 mc amplifier, a 6360 intermediate power amplifier and a 5894 final amplifier.

The oscillator is an oscillator/tripler type, using 8 mc crystals and a capacity voltage divider to give that needed kick to make most 8 mc "rocks" take off on third



overtone. This is a good circuit, most of my 8 mc crystals oscillate in it. Remember however, this is a multiplier circuit and that the output is a third overtone, not a third harmonic. Due to the cut of the crystal, the holder, the holder plates and the crystal manufacturer, each crystal will have a different frequency output. Because of these factors all crystals will vary several kilocycles from their indicated frequency, so do not use your band edge "rocks" until you monitor the final output or you could be outside the band. The multiplier stages are straight forward with no trick circuits and the amplifier stages, also straight-forward, require no neutralization. Although no neutralization is needed, care must be taken to shield the doubler from the first amplifier to prevent 144 mc oscillation. This was done by shielding all the small tubes, 6C4 to 6AK6 amp., and running a shield across the bottom side of the 6AK6 amplifier socket. Since the driver unit runs at 250 volts, or less, the heat from the tubes, while shielded causes no problem. Self-oscillation at 144 mc can also be experienced in the 6360 stage if a shield is not used across this tube socket. In the 5894 stage no problems exist as the grid is below, and the plate circuit above the chassis. The manufacturer, Amperex, states both tubes, the 6360 and the 5894, are internally neutralized and I have found this to be so. But do not push your luck with careless wiring and poor parts layout, as some interesting self-oscillation problems could exist. My "bread board" layout showed this to me.



SOCKET SHIELD DETAIL
FOR 6AK6 AMP & 6360 IPA

DIAGRAM TWO

GENERAL CONSTRUCTION

All of the parts but one, except sockets, came from the junk box and parts on hand (I have a 20 year collection). As for parts, the only unusual ones will be a 5894 socket, a split tank capacitor for the 5894, miniature butterflies and BNC connectors.

The chassis for all units; driver, I.P.A. and final, is sheet copper. Copper was used, as solder can be applied. This makes possible the direct grounding of socket lugs and ground connections, also the application of the needed shields can made by direct soldering with a husky iron.

Before the driver unit was assembled on the copper plate, it was "breadboarded" on an aluminum plate. It was on this plate each of the stages was worked out. It is recommended that after the parts are mounted and filaments wired, each stage be wired and tested, from the oscillator on, to prevent any "built in" trouble that could occure. In this way you know that the finished stage is operating and supplying drive to the next stage. I bring this out, as if trouble develops in testing, and it could, you know the stage in which it exists. Anyway, test data and chassis layout will be given in detail with each unit.

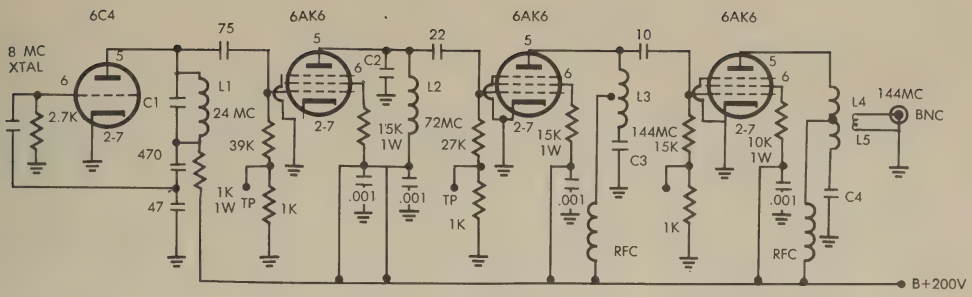
THE DRIVER UNIT

As mentioned earlier, the system was mounted on copper plates and was to be used as a bench test rf source. The driver unit and also the 6360 I.P.A. were then mounted on an inverted 3x17x4 aluminum chassis. No attempt was made to add a front panel.

The driver unit is built on a 4x12 copper plate with the sockets, air trimmers and BNC connector mounted inline on the plate centerline. Since parts will vary, exact layout is not shown, but a general idea is given by diagram one.

The socket shield for 6AK6 and the 6360 is shown in this diagram. Although copper was used, aluminum can be used by bending a lip on the shield and mounting with nuts, bolts and star lock washers, between the shield and chassis, for good positive grounding.

Again I call out stage by stage wiring and testing to eliminate possible construction error. The Driver data shows the stage



L1 15T No. 18 Enam. 5/8"d. Tight Wound on 5/8" Lucite Form
L2 5T No. 16 1/2"d. Spaced 5/8"
L3 5T No. 14 1/2"d. Spaced 9/16"
L4 6T No. 14 1/2"d. Spaced 3/8" per Section, Center Separation 3/8" for Ls
L5 2T No. 16 1/2"d. Spaced to Fit in L4

C1 8 Plate Air Trimmer
C2 5 Plate Air Trimmer
C3 5 Plate Air Trimmer
C4 15 Plate Miniature Trimmer

RFC Z-144 or RFC-144

All .001 Caps. Feedthru Type

drive readings, and from this you can check your progress.

When the 6AK6 amplifier is ready for testing, a 47 pilot bulb makes a good dummy load. It will glow to a brilliance that will hurt the eyes when the 6AK6 is properly tuned. Leave the test meter in the 6AK6 amplifier grid position and remove the crystal. The dummy load should go out and grid current drop to zero. When this happens you know the shielding from the tube and socket shields is effective and no coupling from the preceeding stage is taking place.

THE 6360 INTERMEDIATE POWER AMPLIFIER

I hate to say this, but, there will probably be some of you who will not be interested in the Driver unit as you are running "Twoers." The Twoers makes an excellent driver unit and will drive a 6360 nicely. No attempt was made to make the 6360 IPA a "linear" but it can be used as a modulated final on a "Twoer" or similar equipment.

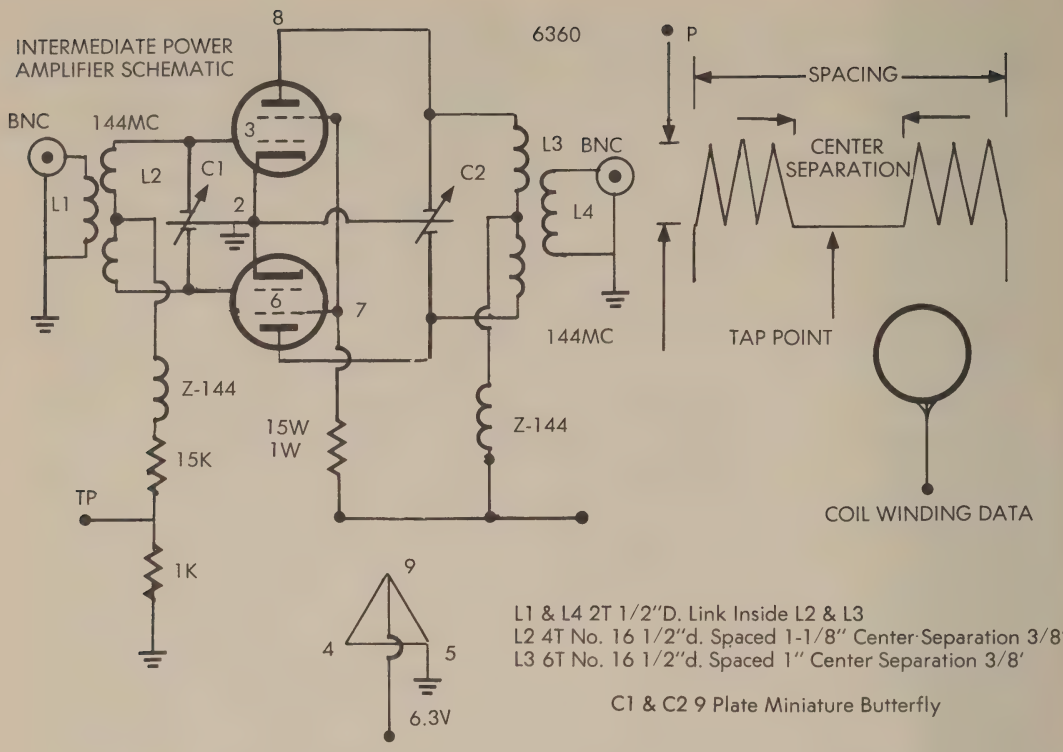
The IPA was built on a 4x5 copper plate and mounted, in line with the driver. It was coupled with a short coax jumper. The IPA data shows the drive needed, and it is recommended that at least 3 ma of drive be at the 6360 grids before B+ is applied to the plates and screens. For those of you who want to stop here, a 100 ma meter can be wired in the plate circuit for plate tuning. At resonance, under load, the plate current will be around 60 ma. at 250 volts.

Care should be taken in this stage to shield the tube socket as feed through signal from grid can cause self oscillation. Here too, the check of removing the crystal and reading the grid current, as well as loss of load, will show proper shielding.

THE 5894 FINAL

The final was built on a 4x6 copper plate and mounted on a 3x6x4 chassis. It was built with parts on hand. A longer plate should have been used as the chassis had to extend to receive the plate tank and pickup link. Although, mechanically, the layout leaves much to be desired the circuit operates smoothly.

The first attempt at the grid circuit design was to tune the input to the 5894. With the components on hand a suitable tuned



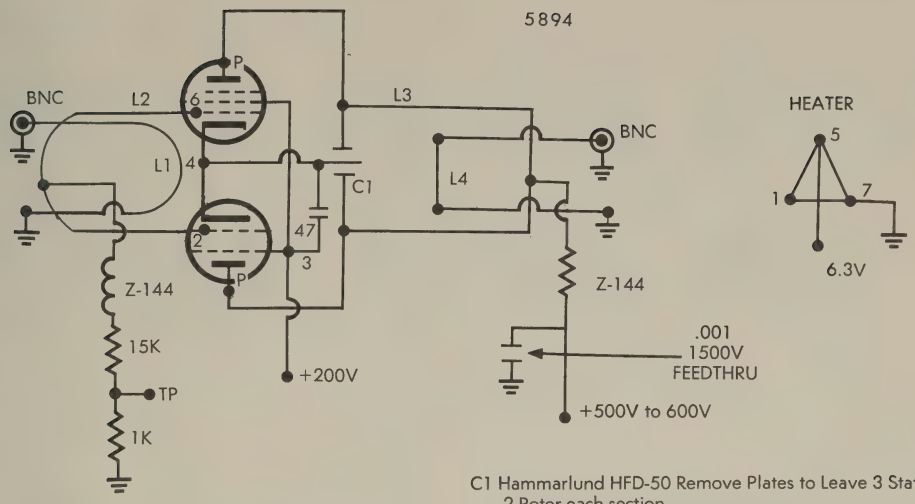
could not be favorably worked out, so the input circuit was left "fixed tuned." This was done by cutting a "hairpin" tank until it resonated with the tube capacity at 146 megacycles. The tank, being too long for the chassis, was bent 90 degrees at the midpoint and hung down into the chassis. At the midpoint, two bent ceramic insulators were mounted to add rigidity. Since the "U" portion of the tank hung down the input link was mounted perpendicular to the chassis late from the BNC connector and a ground lug spaced the width of the grid tank. This mounting allowed me to "swing" the input link for proper coupling from the 6360. This will also allow coupling variation if linear operation is anticipated.

Two sources of drive were used to check the grid circuit. These were the aforementioned driver and IPA and my Communicator IV, both of which use a 6360. The Communicator was used at I do not have band extreme crystals and the VFO capabilities into Communicator could be used to check the tank range. More than adequate drive was obtained throughout the entire band.

The plate tank was made from a Hammarlund HFD-50 with three stator and two rotor plates left in each section and a piece of number 10 copper wire bent into a flat "U". The "U" was cut until 146 megacycles resonance was reached at mid capacitor range. This was done by checking with a grid dipper. The pickup link, also of the configuration, was mounted the same way as the grid links. In this manner of mounting it could also be swung for coupling.

In establishing the grid drive to meet the tube requirements, several grid resistors were used. A value of 15K gave the best ratio of current to voltage for the 5894 grids. Screen voltage was taken from a separate 200 volt source so no screen resistor is shown. Again the approximate drive shown in the data should be obtained before B+ is applied to the tube.

The dummy load used, an RF Wattmeter, would not accept a fully coupled load so the data shown is far from full output. A hundred watt bulb, used also as a dummy load, showed almost full brilliance, so quite a bit more output can be expected under full load.



C1 Hammarlund HFD-50 Remove Plates to Leave 3 Stator & 2 Rotor each section

L3 "U" 3-1/4 Long, 1-3/16 Wide

No. 10 Wire

L4 "U" Pickup Link, 3-3/16 Long, 1-3/16 Wide

No. 14 Wire

L1 "Hairpin" 1-5/8 long, 1-1/2 Dia.

No. 16 Wire

L2 "Hairpin" 3-3/8 Long, 1-1/2 Dia.

No. 16 Wire

DIAGRAM FIVE

MODULATION

The driver unit was Heising modulated for reference only. This was done by running the B+ through the output transformer of a small broadcast receiver and connected to the 6AK6 amplifier. A station was selected and the level set for the proper modulation. Good quality was obtained from a 12SQ7 and a 50L6.

Several 6360's have been used at the Santa Cruz Island QTH. These were modulated with a pair of 6V6's into a TCS modulation transformer. Repeats were always good on modulation with these transmitters and this modulator. However, any good ten watt modulator will do the job. The modulated signals is coupled to the plate and screen, through its dropping resistor, in this

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6360 DATA

DRIVE 4.4 MA No Load (B+ OFF ON PLATE & SCREEN)
3.2 MA Loaded

SCREEN—Dropped thru 15K Resistor

PLATE +250 V +300V (Loaded To Termaline Wattmeter)

OUTPUT 8 Watts 12.5 Watts

DRIVER DATA	**+200 Volts**	**+250 Volts**
drive to tripler	1.5 ma	2.1 ma
drive to doubler	1.0 ma	1.3 ma
drive to amplifier	2.0 ma	2.1 ma
Power out amplifier (RF to Termaline Wattmeter)	1.25 Watts	2.5 Watts
Total current drawn (all driver tubes)	98 ma	125 ma

5894 DATA

DRIVE 9 MA B+ OFF PLATE & SCREEN
7 MA B+ ON

SCREEN +200V

PLATE +500V at 162 MA
*(Loose Coupled to Termaline RF Wattmeter)

INPUT 81 Watts

OUTPUT 45 Watts

*Wattmeter has 50 watt range, this accounts for loose coupling. Higher output can be had with tighter coupling.

configuration.

The first 5894 rig was modulated with a pair of 6146's into a TCZ/ART-13 modulation transformer. Because this rig was traded before it went into operation, "on the air" reports were never received, but the local tests sounded very good. Anyway the presence or absence of modulation will be the builders choice. I have mentioned the various methods I have used to give you a point from which you can start thinking.

CONCLUSION

This article is presented to start you, carry you on or help you "beef up" your present, 2 meter RF capabilities. The circuits have been worked out and double checked to prevent any miscalculation. Electrically, I believe they are sound and fewer as I believe the builder will want to inject his personality into the layout and packaging. Keep in mind to follow good VHF wiring procedure, clean layout of components, short solid ground connections and testing of each completed stage, and you'll come out a winner!

—WB6AOW—

Letters

Dear Editor:

You said in April VHF that others might be interested in what I did to my International Crystal FCV-2 converter. To me, overload PROOF and overload RESISTANT are a matter of definition. Overload proof is what the Clegg Interceptor receiver is. However, my FCV-2 is only overload resistant, i.e., no cross modulation is evident; a Johnson 6N2 running 100 watts, beam-to-beam, separated 160 feet, is virtually un-noticed plus/minus 45 kcs. Good enough?

John P. Skubick, K8ANG
Warren, Ohio

John:

OK — that's good enough for us. Draft up an article and we'll print it pronto. International might even be persuaded to incorporate the changes into their production line FCV-2's.

Editor

Dear Editor:

We have been browsing through the February issue of VHF Horizons which was forwarded here to Inchon, Korea, and must comment on the insert between pages 12 and 13 in this issue. This is not the first time the "great prophet from the east" has goofed. In last December's issue of his magazine he made the brash statement that he had "the most elaborate VHF installation in New Hampshire" — or words to that affect. We challenged him on that and received a polite reply that he guessed "he had spoken out of turn." Hi! Would appreciate a few words in your June issue to the effect that we will be back in operation at the home QTH June 1st and looking for M/S skeds on 144, especially from Minnesota and points west.

73,
Don — W1AZK

Don:

Consider the word spread.

Editor

Dear Editor:

I have finally decided that your magazine was due for a few comments from my neck of the woods — so here goes. I would first like to mention that I enjoy your magazine very much and have subscribed to it, I feel that it is put together in a very good manner, and my only real complaint is there isn't enough in it to satisfy my taste for VHF operating and experimentation.

David Heifetz, K1PDA
Manchester, N.H.

Dave:

For the record, the size of the book is directly proportional to income. Income is directly proportional to number of subscribers plus number of advertisers. We'll add pages when there's money enough to do it! In the mean time, we have to be very selective when wading through the pile of manuscripts received every week.

Editor

Editor:

The article in April VHF Horizons on E-skip on 2 prompts me to file my observations of July 10, 1961 (the date in question). I was operating W0AXU, Cedar Rapids, Iowa at that time. At 2122 CST I heard W0IC calling CQ and he came back to my call (S9 plus) and then faded out. At 2146 W0IC was worked again and I was on phone. In between, W0AYK in Loveland, Colorado was heard. W9AAB worked K7-HKD at about 2146. W0IC was in for over 30 minutes here. A check on six meters showed Colorado to be coming in, nothing else that I could tell. W0IC must have worked several W8's and VE3's at least. The W0IC to Cedar Rapids path is only 720 miles and to work this distance on Es requires a critical frequency of 50 mc! I conclude, however, that the opening must have been Es, and my QSO with W0IC must be about the shortest Es ever observed on 2 meters. The cloud must have been small as the stations to the west of me in Iowa and Nebraska didn't hear a thing, which adds up to Es evidence.

Dick Fenwick, W5KTR

Dick:

We've all been assuming straight-line propogation in this case, which possibly wasn't true. Did you get a true beam heading on W0IC and W0AYK during your listening period? Perhaps the cloud was off-path to the south and tilted.

Editor

Sir Editor:

Received your latest edition and found it quite sterling. Just what the VHF doctor ordered, to be sure. Several of the boys down here have seen it and will be subscribing directly. We had to give up our six meter band for TV, finally, so everyone is going on 1296. I'm chattering 60 airline miles here in New South Wales nightly now on 1296. Some of the boys are going on mountain tops and it's great sport.

VK2ZCF, Croydon, N.S.W.
Australia

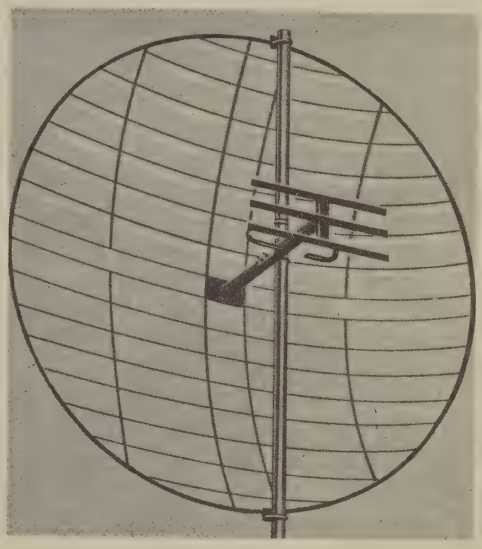
CHEAP GAIN ANTENNA FOR 'L' BAND

FOUR FOOT DISH FOR 1296 Mc

John T. Chambers — W6NLZ/A6NLZ
% VHF Horizons

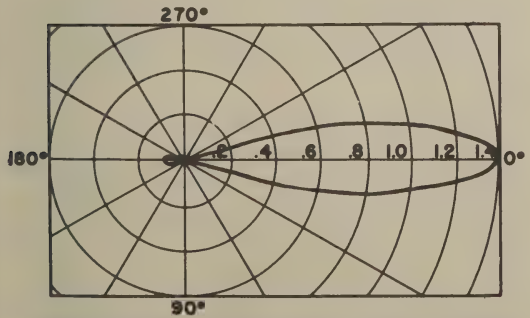
Most of the 1296 gang sooner or later want to try a parabolic reflector. Until now surplus military reflectors and a few home brew models have dominated the band. The main disadvantage to the military dishes has been their extreme bulk. Most of them look like they were built for a battleship—and they probably were!

Recently a commercial manufacturer* of almost all kinds of antennas brought out a parabolic reflector antenna for the UHF TV trade. Four feet in diameter; very light, but sturdy construction — and a net price under $20.00. As it comes, TACO's model 3050 UHF Parabolic must be modified to work on 1296. The feed elements are too long, and the mesh in the reflector too far apart. Conversion to 1296 is simple since the hot dipped galvanized of the reflector assembly is easy to solder to. Merely double up (add another set of horizontal wires) the mesh curved to match the shape of the dish. Soldering the new bars in place is simplified by tying them in place with No. 30 tinned wire before soldering.



Before modification, the front to back ratio of the antenna was 5 DB. As 1296 Mc is well above the maximum design frequency of channel 83. After modification of the reflector (doubling reflector bars), the front to back ratio rose to almost 20 DB or very adequate.

Modification of the feed (blue anodized aluminum) was as follows: The driver (where the feed line attaches) was shortened to 4½ inches by cutting, re-bending, and drilling new holes to attach the feed line with. The three bar illuminator reflector was cut off to a total length of 7 inches. How much gain now? Just a fraction over 20 DB.



HORIZONTAL RADIATION PATTERN

*TACO (Technical Appliance Corporation, Sherburne, New York)

NOSTALGIA CORNER

VHF EXPEDITION

- CIRCA 1941 -

by A. David Middleton, W5CA/W7ZC
Staff Historian, VHF Horizons

Thousands of QSO's have been added to my logs since that summer day in 1941, but none of them are more vivid in my memory than the one in which the entire future of a new ham operator possibly hung in the balance.

I have just reviewed my 1941 log books hoping to uncover the call and identity of a certain Brooklyn ham, but I found no written notation of anything that would identify this particular QSO from those so numerous in those happy VHF days just before WW2. W20EN, at Kilocycle Hilltop, Middletown, New Jersey worked a lot of W2s and many in Brooklyn so alas the call and name are not known. But the implications of the QSO and its details are clear. I have often wondered what ever happened to my contact after that day.

It was a hot muggy New Jersey Sunday afternoon. There was a decent breeze blowing thru the shack's windows and I was debating whether to get on the air or not. I sat idly tuning the dial on my "French 75-acorn-regen" and wondered if a QSO with Nature out on the hill under an apple tree with a tall glass of cool lemonade, might not be better than an on-the-air QSO inside. Radio won out, however, and I listened across the 112 MC band. There were the usual Sunday squeals of the mobileers chasing each other up and down the bands with their transceivers — the ones with the "19 type" tube in them and the "J" antennas! General activity was pretty low as most guys were outside on a day like this.

I strolled out onto the hill and up to the base of my tall mast. I swung the capstan bar around so that the 15-element beam was aimed up the coast of Long Island Sound. Some maritime-mobile might be on or perhaps some vacationers on the shore.

A CQ brought a reply from a station out on the tip of the Island. Not a bad haul for 112 MC. But like me the fellow was only half-interested and the QSO died on the vine.

When I signed off and stood by on the band I heard a signal frantically calling W20OEN. (Let's assign him the call of W2XYZ). The signal was weak, wobbling all over the band and hardly understandable. But the urgency of the call was not to be mistaken! This guy was really trying to raise me.

Finally, he wound up his almost interminable call and stood by. I caught his call and his location—"W2XYZ—Brooklyn."

I replied and acknowledged his call and gave him the usual report. You know, the kind when the guy is a poor operator and his signal is even worse! Non-committal—and sort of "so what."

There was a long pause. Then the carrier came on and in the far distance and off mike, I heard a voice say—"**you see—it does work!**". Then the voice picked up and W2XYZ continued in a boyish tone, eager and excited and somewhat scared. It was obvious that this guy was NOT a highly skilled VHF man. Finally he steadied himself and gave me the usual report that I had heard so often W20EN was booming in Brooklyn. But, the operator asked me to repeat my location. He gave me his name—"Joe".

I went back to Joe and told him I was on a high hill overlooking the New York area and that I was near famous Telegraph Hill, Northwest of Red Bank. I added "Why the interest in where I am?"

The next remark was a stopper! A man's voice boomed out of my speaker saying, "How do I know you are near Red Bank.

That is a long way from here!" The voice was almost dubious.

Here was a queer situation. No one had ever questioned the authenticity of my QTH and it seemed rather strange. After all—how does one prove over the air just where he is operating?

There was confusion at W2XYZ and then Joe came back on the mike and startled me by saying. "My father does not believe that you are operating in Middletown. You are too loud!"

I had been accused of being "too loud" before, but no one ever questioned my locale. I snapped back at Joe and demanded to know what difference did it make anyway, and anyway what did his father have to do with our QSO!

Joe came back and what he told me was a real kicker. His simple poignant story has stuck in my memory. Here it is, without embellishment.

Joe was a teenager. He lived in a poor section of Brooklyn and attended high-school. He had some ham friends who were as unskilled and as embryonic as he. He had studied; taken the ham license examination passed and had received his call. He was not interested in CW and so he chose the easiest band on which to operate voice —112 MC.

Money was scarce in the family home of Joe. He had to work hard and scrape together a lot of bucks before he could bring home equipment for a 112 MC. He chose widely-used Abbott DK-2 transceiver. This was a battery-operated unit, one that was thoroughly distasteful to the more serious class of VHF amateur. The DK2 had a notoriously bad signal but it was cheap and, under good conditions could get out —but it was hard to copy and tough on batteries! It had a simple circuit and was—what was considered a minimal station in 1941.

Joe had gotten his equipment but he was faced with that perennial problem—that old devil—Antenna! The best he could get up was a double dipole fed with twisted pair—the old green and yellow lamp drop cord which was the fore-runner of the coax and Twin-lead so widely used today. However, the old "twisted pair" had high losses at 112 MC, so Joe did not get much into or out of his antenna! The dipole was up somewhat on the apartment building, Joe was a bit vague just where.

W2XYZ made a few contacts all locals! To Joe, local meant just that — stations only a few blocks away and usually with the group that had introduced him to ham radio. Many stations ignored the DK2's when possible. Joe's pals could not work out well either.

Then came one eventful day when Joe heard W20EN blasting in from Middletown. Here was DX! Now if he could only work that station! He tried hard but W20EN did not reply to his frantic calls. He wore down a set of batteries. These had to be replaced by more scraping of hard-to-get dollars.

Joe could hear other "outside stations" at times but they would not answer him. He knew that if he could only work W20-EN he would break the jinx and blast thru the barrier to the realm of VHF DX. Joe had made some exaggerated claims and statements to his parents and they expected some results from all the expense and much shouting into the carbon mike! Not to mention the squeals and whistles given out by the DK2 receiver section!

Then Joe had a happy inspiration! He knew that 112 MC would work out much better if the antenna was out in the open where there were fewer buildings and wires to shield these feeble warbling signals from the DK2. Right that moment Joe conceived the idea of VHF DXPEDITION although he had never heard the word as it was not in common usage until after the War.

Joe's family possessed no car or access to one. So he and "Father" lugged the DK2, a batch of heavy dry cell A and B batteries, plus some sort of antenna lashup out into one of Brooklyn's many public parks. There on a park bench, W2XYZ was set up. Joe had heard W20EN regularly on Sunday afternoon so the expedition was mounted for that period.

What was the results of all this effort? The primary purpose was to work W20EN and that was accomplished. A two-way QSO with an "outside" station proved that the much maligned, expensive (to Joe) unit

could work all the way across the Bay into New Jersey a spot that was considered to be a "foreign land" to many Brooklynites.

I talked like a Dutch uncle to Joe's dad, and as clearly and accurately as possible, I tried to convey to him the fact that W20EN was where I said it was. I gave him the geographical facts of my location and described what I could see. The fact that I could see the gas tank at Coney seemed to carry more weight than anything else I could bring out.

Eventually I sent a QSL to Joe, but never received a reply. I suppose that QSLs and their stamps were not included in Joe's budget. So to this day I do not know what happened to Joe and his VHF work as I never heard W2XYZ again.

However, I'd like to know. So—Joe, if by chance you read this article, and if you are a VHFer today you will—please identify yourself, and I'll pass the word along to the VHF gang.

What do you think, OM? Is "little Joe," W2XYZ still on the air? I like to think so!

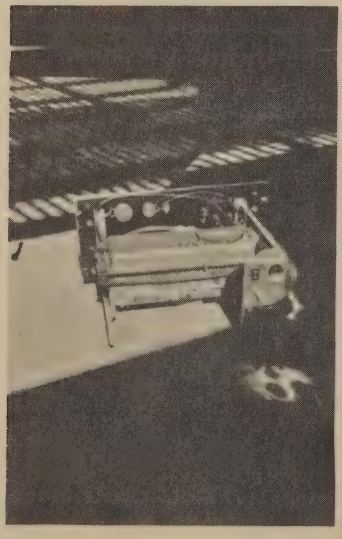
STILL A GOOD WAY . . .

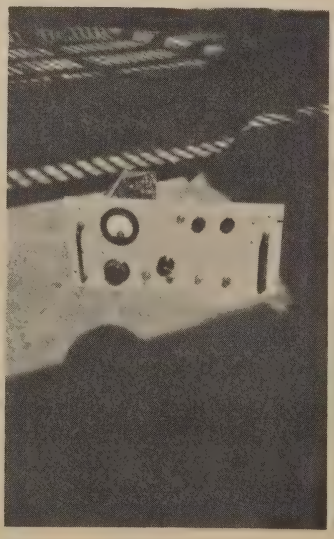
TDZ TRIPLER TO 432

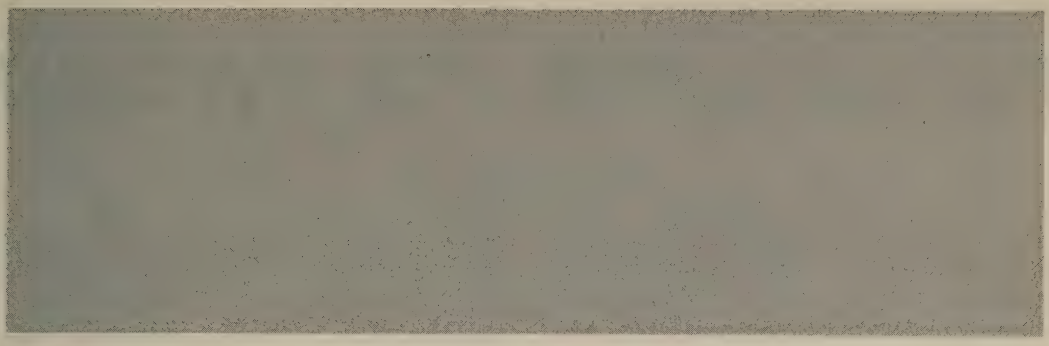
Louis R. "Dick" Bailey
W6IEY/A6IEY
6273 De Camp Dr.
La Mesa, Calif.

There is nothing new in this method of getting on 432 mcs. W6MMU published the circuit in the December 31, 1959 issue of "Western Radio Amateur" and it was repeated in the "VHF Amateur" at a later date. However, I believe that the way it is mounted is neatly done and may give someone the urge to get on 432 mcs very easily. The only requirement is a little drive (modulated) at 144 mcs. A Communicator or an SCR 522/as used here will supply this.

The tripler unit that I acquired at one of the local surplus emporiums did not have the original blower attached and I used a 28 volt surplus dual outlet blower on hand to supply the needed air. The extra outlet will be used to supply air to the amplifier unit when completed. A 28 volt DC supply was incorporated to run the blower and an external antenna relay.



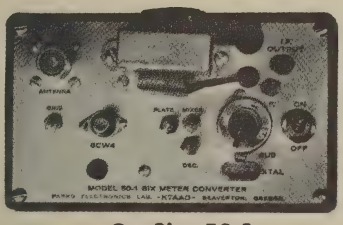




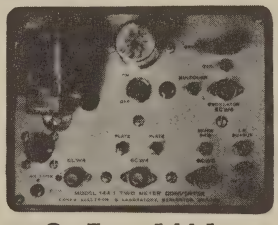
The input tuning condenser is tuned with a reduction knob from a BC375 tuning unit on an extended shaft. The chain drive for the plate line is the original with an added chain drive to offset the knob away from the input condenser shaft. Some gear ratio was added here to provide smoother tuning. The Meter is for plate current at 60 mils with 750 volts on the plate. A filament transformer with a variable resistor in the low voltage side is used to give six volts at the 2C39 filaments.

This unit is excellent for local work, however, for DX type phone work not enough "Lumps" on the carrier are produced to give good modulation percentage. Best DX with this unit so far has been 120 miles on check-ins to the MARS 432 R & D Net with WA6HIT.

THESE VHF CONVERTERS HAVE



G.U.T.S.*



On Six, 50-1 **On Two, 144-1**

***G.U.T.S. — Genuine Undeniable Ten-fold Selectivity.**

Well the summer DX season is here. ARE YOU ENJOYING IT? Getting your receiver good and clobbered by your local DX chasers. Unable to operate within 100 or 200 kc of the high power boys? You say your receiver just folds up and quits? Tell you what I'm gonna' do. I'm going to ship you a Parks 50-1 (for six) or Parks 144-1 (for two) by parcel post. You tell me what i.f. you want (7-11, 14-18, 30.5-34.5 for six or two, with additional 26-30 and 27-31 for two, or 10-14, 26-30, 27-31, 28-32 for six). These are the finest anti-clobber, low noise, high gain VHF converters on the market. Ask around — see how many of the top-notch operators already have the Parks-Pair for six or two. Each with self-contained power supply. Each ready to plug in and go! Excellent shielding. Excellent noise figure (3 db on 2, 2.5 db on six).

50-1 6CW4 neutralized triode front end, 6U8A pentode mixer-oscillator. We ship to your door parcel post for $34.50 each.

144-1 four 6CW4 Nuvistors. We ship parcel post to your door for $54.95 each. See Review in Dec. issue of VHF Horizons. (220 model soon!)

PARKS ELECTRONICS LABORATORIES

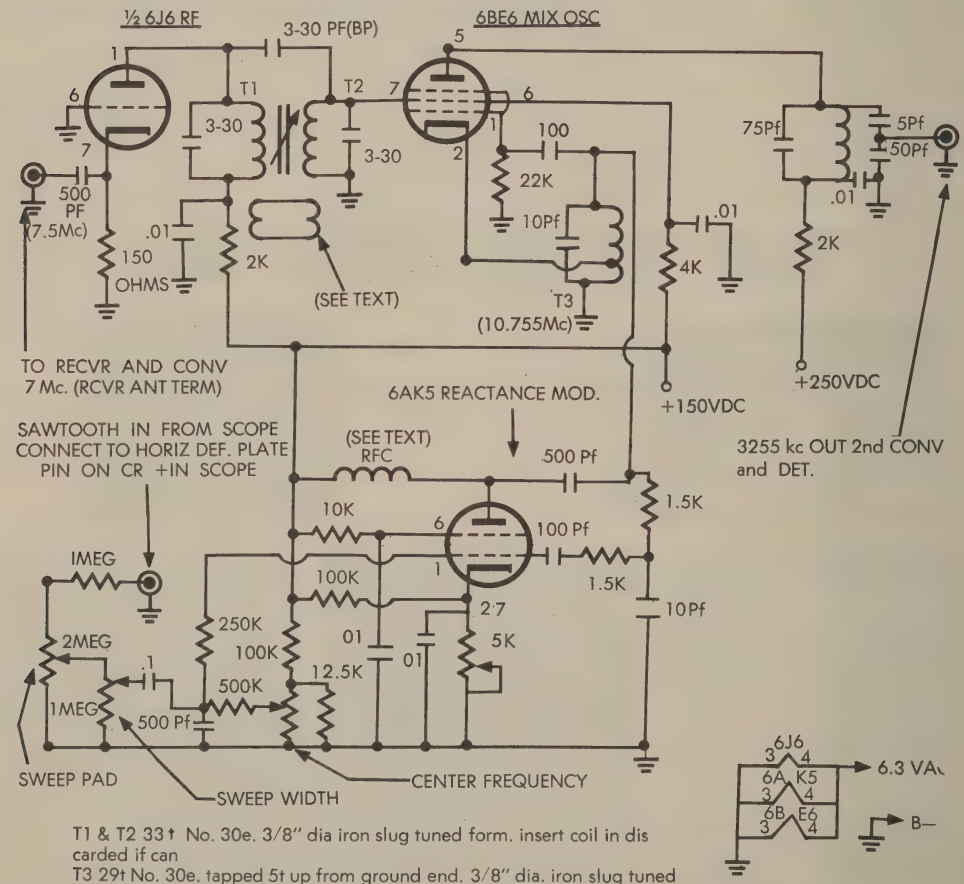
ROUTE 2, BOX 35 — BEAVERTON, OREGON

THE BETTER TO SEE YOU WITH

PANADAPTER FOR TWO/SIX

JOHN A. FREDRICKS K7GGJ
314 South 13th Avenue
Yakima, Washington

There are many amateurs today who operate with the advantage of panoramic reception. Just ask them, if you are one of those who does not have a panadapter, what you are missing. They will tell you they couldn't operate without the thing! The idea for the panadapter described here is far from new but, here is the advantage: This particular panadapter will "see" more of the band in question (about ± 450 to 500 Kc) and this is in itself is a real advantage. Imagine yourself "seeing" approximately 1 Mc of the band without turning the dial on your reciver!



T1 & T2 33t No. 30e. 3/8" dia iron slug tuned form. insert coil in discarded if can
T3 29t No. 30e. tapped 5t up from ground end. 3/8" dia. iron slug tuned form. Insert in discarded if can.
T4 45t No. 30e. 3/8" dia. iron slug tuned from. Insert in discarded if can.
All resistors 1/2 watt.

FIGURE 1

CONSTRUCTION

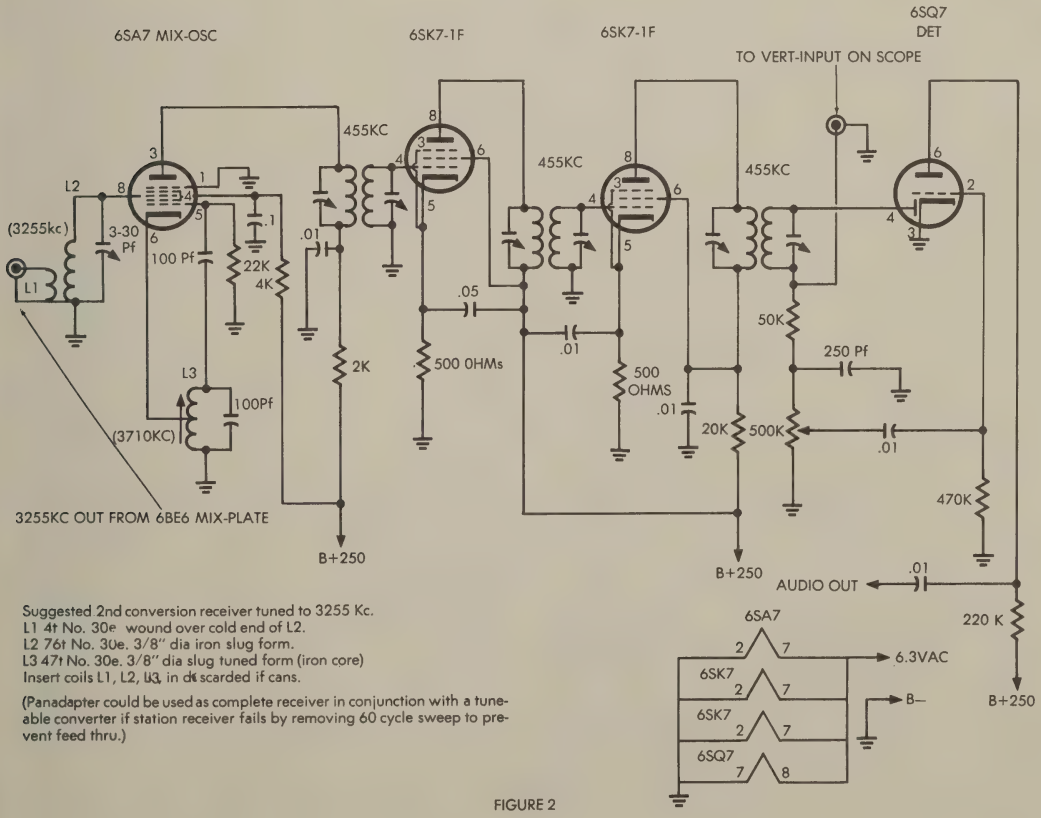
My unit was built on two separate chassis one measuring 2"x5"x8' for the panadapter proper and one measuring 3¼"x2"-8" for the 2nd conversion receiver. The construction of the panadapter is not at all difficult if you keep one thing in mind: Make sure to keep all leads as short and direct as possible! Looking at Fig. 1 you will notice that between T1 & T2 there is a link coil coupling the two windings. This is made up of 4t of No. 30e. close wound on the cold end of both coils and connected with a short piece of 75 ohm twinlead.

You will also notice the RFC in the B+ line to the plate of the 6AK5 reactance modulator. This choke is made up of one section of a 2.5 mH RF choke.

In my unit I was quite liberal with the use of terminal strips as I found it necessary to maintain mechanical rigidity, a factor very important to proper operation. It also is advisable to use mica capacitors in both the 6BE6 converter stage and the 6AK5 reactance modulator stage, in order to maintain maximum stability. Other than the aforementioned points, I don't think any thing else need be said about the converter — reactance modulator unit is it is quite straight-forward in construction.

Now let's go on to Fig 2. The first thing we might say is "what is all that old junk doing in there?" Well, its just what I happened to have on hand at the time that I built the unit. This does not mean that the builder has to use such outdated tubes at all.

Looking again at Fig. 2, the receiver is a bit unorthodox, and some trouble was experienced with the first model, but, after adding Bridge neutralization to the i.f. stages all was well and trouble free operation has been the order of the day ever since. As I stated earlier, I can see no reason at all for not modernizing the receiver with up-to-date tubes but this is up to the reader.



Suggested 2nd conversion receiver tuned to 3255 Kc.
L1 4t No. 30e wound over cold end of L2.
L2 7½t No. 30e. 3/8" dia iron slug form.
L3 47t No. 30e. 3/8" dia slug tuned form (iron core)
Insert coils L1, L2, L3 in discarded if cans.

(Panadapter could be used as complete receiver in conjunction with a tuneable converter if station receiver fails by removing 60 cycle sweep to prevent feed thru.)

FIGURE 2

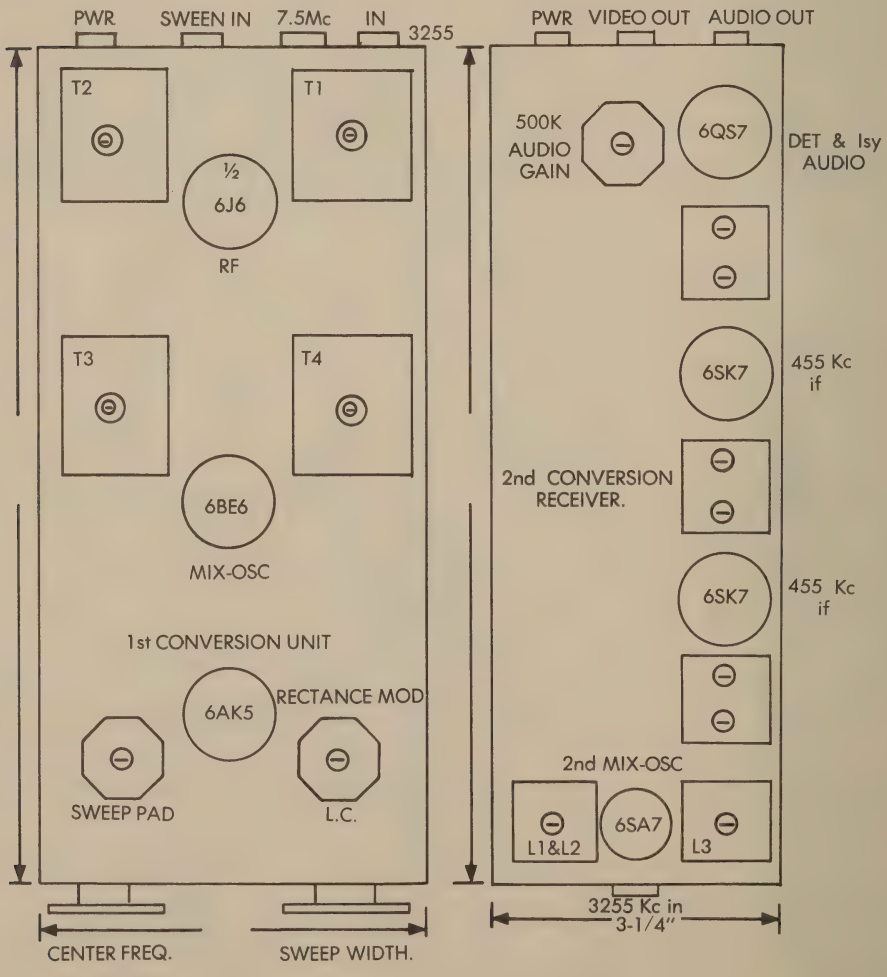
SAWTOOTH VOLTAGE FOR THE REACTANCE MODULATOR

Sawtooth voltage for the reactance modulator was, in my case, taken directly off the horizontal deflection plate pin of the crt in the scope itself, although in some cases it may be necessary to take the sawtooth voltage off the sweep oscillator within the scope.

ADJUSTMENT

The first step in adjustment is to connect the sweep voltage out of the scope to the input of the reactance modulator and the output of the panadapter (2nd Det) to the vertical input terminals of the scope. All connections between the panadapter receiver and the scope were made with shielded microphone cable, as the use of coax seemed a bit unnecessary. Next connect the appropriate voltage to the panadapter receiver. At this point I might mention that any small regulated power supply capable of + 250 and + 150 VDC at 120 to 130 mA and 6.3 VAC at 4 amps will suffice.After the aforementioned voltages have been applied to the panadapter receiver, turn the scope on

CHASSIS LAYOUT OF PANADAPTER
(general layout)



All connectors shown are standard mic connectors, coax connectors could be substituted.

FIGURE 3

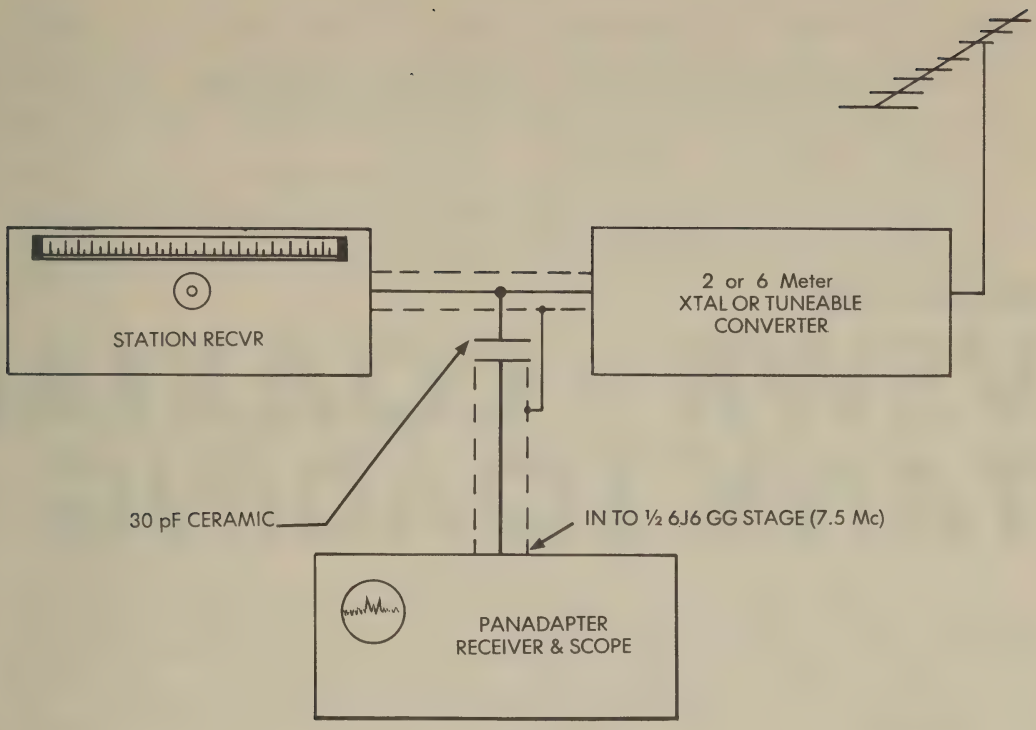


FIGURE 4

and allow both to warm up. At this point a 7.5 Mc signal should be fed to the panadapter input (gg ½ 6J6) with all potentimeters set at half-mast. Then slowly tuning T3's iron core, a pip should appear on the screen of the crt. After centering the nip on the crt screen (7.5 Mc) tune T4 of the 6BE6 mixer plate & L2, of the 2nd conversion receiver for maximum height with the vertical gain control in the scope about ¾ open. I would also like to point out that I had already tuned up the 2nd conversion receiver to approximately 3255 Kc beforehand. Although this may not be entirely necessary, I felt that it would surely speed things up. Now with the pip centered on the crt screen tune T1 & T2 for maximum height and maximum frequency response over the range of 7 to 8 Mc. There should be very little deterioration of the pip over this range. The amount of the spectrum seen will also be determined by the setting of the Sweep Pad, & Sweep width potentimeters. As can be seen from above, the tune-up procedure is really quite conventional and I don't think any real trouble should be had if directions are followed carefully.

PUTTING IT INTO USE:

The panadapter should be connected between the converter and the receiver as shown in Figure 4.

CONVERSION AND TUNE-UP CHART
1st conversion
mix — 7.5 Mc.
osc — 10.755 Mc.
mix out — 3255 Kc.
2nd conversion
mix — 3255 Kc
osc — 3710 Kc.
out — 455 Kc.
detector — 455 Kc.
Band-pass
T1 & T2
Peak slug on low side of 7.5 Mc (hi sig)
Peak 3-30 pF (B.P.) on high side of 7.5 Mc (low sig)
Scope set for 60 cycle sweep rate.

Although this panadapter was designed around a tunable converter such as the RME VHF-126, performance leaves little to be desired when in use with crystal controlled converters. The only drawback is the fact that the pips will not move across the screen as they will with a tunable converter but the scope screen can be readly calibrated to show the frequency on which the pip is

appearing. At K7GGJ this particular panadapter has been in use with crystal controlled converters on both two and six meters and the performance has been very satisfactory. Also let me say this: although coil specifications are given for 7.5 Mc, if your converter has an i.f. of 14 — 18 Mc or any of the other popular i.f. oututs, the first conversion stage (6BE6) could be made to operate in conjunction with the 2nd conversion receiver at these frequencies without any difficulty, with the help of a grid-dipper.

Well that wraps it up, good luck with the panadapter. Once you have built it you won't operate without it!

GOOD TO KNOW

VSWR vs COAXIAL TANK LOADING

Here is an interesting exercise for those VHF'ers using converted surplus units which feature coaxial cavity amplifiers, or those who have built up their own coaxial cavity amplifiers for 144, 220 or 432 megacycles.

In a staff report appearing in our October, 1962 issue, we reported on the design characteristics of a pi-network and the usefulness of this circuit at VHF frequencies.

Recognizing that a pi-network is essentially "a cheater device" for making our final think our feedline is flat, and thereby bringing our VSWR down to a reasonable value for loading of the final (as far as the final is concerned, from a load standpoint), we decided to purposely mis-tune a coaxial tank amplifier using a 4CX250B on 220.050 megacycles, and then try to load it into a 32 element colinear array which we had also purposely mis-tuned.

Our goal was to plot the affects of VSWR, on loading of a coaxial tank circuit, versus the VSWR present on the line at the transmitter.

The meter used to measure the VSWR was a calibrated MC Jones (now **Microwave Devices, Bristol, Connecticut)** 120 watt unit. It has a four function switch for forward power, back (reverse) power, calibrate (through a pot) and actual VSWR.

With the final mistuned (through the cavity plunger), but the antenna properly matched to provide a VSWR of 1.0 to 1,

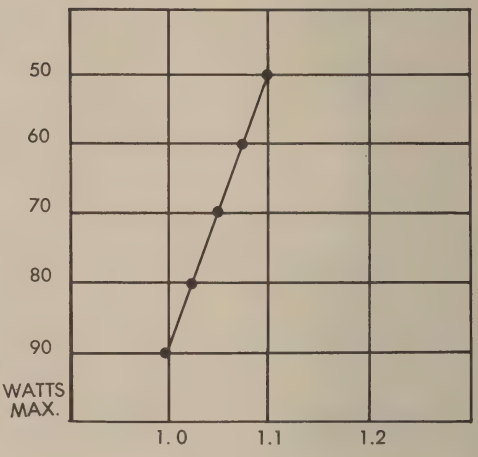


chart number one shows the result. Keeping in mind that the antenna, when properly matched, and the coaxial tank, when properly tuned, will provide 115 watts into the line at 220.050 mc/s, the slight reactance affect of the mis-tuned cavity on the VSWR is plotted in chart number one.

Of perhaps greater interest is chart number two. Here the antenna was mis-tuned to the extent of producing a VSWR of 2.0 to 1, not really very high by modern tolerances. And yet note that with a VSWR of 2.0 to 1, the **mixiumum** loading we could manage through the final was 65 watts.

In other words, with a VSWR of only 2.0 to 1, the final would only load to 65 watts forward power (and 12 watts of reflected power). That's a 43% reduction in transmitter output!

PREVIEW - AUGUST VHF HORIZONS

- VHF SIDEBAND SPECIAL —
  - * Complete Design for 220 Mc SSB by W4LIP
  - * Stable Mixer Circuit for 50 and 144 Mc SSB, by W4LIP
- Planar Triodes at UHF, by W6SAI and W6UOV
- Part One —
  - * Taking 'Amateur' Out of Ham TV, by W5HCX
- VHF Crystal Calibrator for DX, by K8AXU
- 50 Mc F2 DX-Pedition Locales, by W5KHT

PLUS — Several Additional Features
(11 in all)

Place
Stamp
Here

VHF Horizons D.R.P.
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Oklahoma City 1, Oklahoma

UNIVAC PROPAGATION REPORT FORM

Your Location (City and State) _____ Call _____

Geographic Coordinates (to nearest second) Longitude _____

Latitude _____ Bands covered 6 2 220 432 Time in ST

Date/Time		Station		Location	Leave Blank	Sig Rpt	Type Fading	Antenna Heading
Start	End	Wked	Hrd					

Airmail completed report for period July 15

UNIVAC Propagation Project, Box 1557, Oklahoma City 1, Oklahoma

DRP REPORT

From Amateur Radio Station _____ **QTH** _____

This month we built the following _____

_____ And, we improved the following gear _____

On the air DX highlights _____

_____

_____

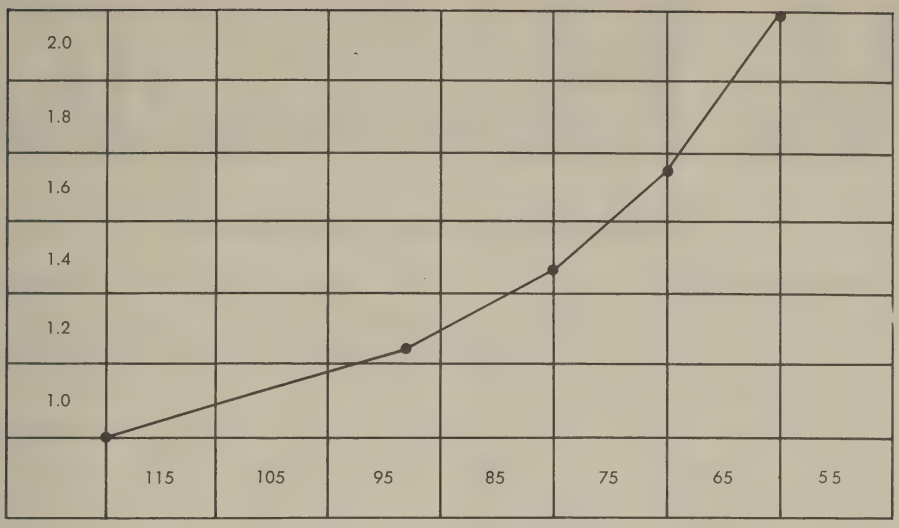
_____

_____

_____

_____

Articles we enjoyed in July issue _____



MC JONES 120 WATT CALIBRATED METER

Retune the matching bars on the colinear, bringing the VSWR down to 1.6 to 1, and the final coaxial tank loading increased to 85 watts forward power.

Bring it down further to 1.2 to 1 (which is a point where most of us are inclined to leave well enough alone) and the final loading increases to 98 watts forward power.

Now make it match perfectly, which is no real effort with a matching stub set such is provided with Cushcraft's colinear antennas, 1.0 to 1 and the final loading jumps up to 115 watts.

With no detectable power being returned.

How important is a flat line when you are using a coaxial tank circuit final amplifier? We think we know. What about you?

HAMFESTS:

Watertown, Alberta, Canada — July 20, 21 — Glacier, Watertown Hamfest. $3.00 pre-registration by July 10. Contact Clif Cartwright, VE6AGM, Box 941, Lethbridge, Alberta.

CORRECTION

Dear Editor:

It was a big surprise to find my piece on the 6M pre-amp in the April issue. This is just about the shortest period between submission and publication in my experience. There are two errors in the parts list. One mine, and one the typesetters, to wit:

(1) The coils are Miller, not Millen 1. to 1.6 uH. The Allied Number is correct.

(2) It is 20 turns of number 24, not two turns. This one should have been pretty obvious to most readers.

I can testify to the effective coverage you have in circulation, having received many comments over the air since the magazine arrived.

Joe Marshall
Ozone, Tenn.

Joe:

Corrections noted. Several of the gang also brought the 24 turns versus 2 turns to our attention.

Editor

Editor:

Your's truly owned one of the AM-33-RT amplifiers for more than a year, and had consigned it to a dark closet. Your recent article concerning the conversion of this unit brought it back to mind and out of the closet. After some time spent in conversion, the rig is now ready to go. I am running 435 watts input to the converted unit and getting 300 watts output on peaks. See you on six SSB, upper, lower and crossways this summer!

Glenn, W4MMP

Note:

Glenn had two pages of details on how he "modified" the conversion article ran in VHF. If there's enough interest we'll get Glenn to make it up in article style. Or have you had enough on the AM-33-RT?

Editor

FANTASTIC SALE

6 meter converter $8.00 postpaid. Complete with 3 VHF transistors and 49.4 mc crystal for output in broadcast band on 36 mc crystal for output in 14-18 mc band. Low noise and better than 1 microvolt sensitivity. Operates on 6 or 12 VDC.

Limited quantity—Send Your Order Today—Dept. V7

VANGUARD ELECTRONIC LABS 190-48 99th Ave. Hollis 23, N.Y.

2 METER CONVERTER

Now at last a 2 meter converter complete with 3 VHF transistors and crystal for output in the 6 meter band. Operates on 12 V. D.C. A real bargain, for only $10.00 while supply lasts.

For output in other bands use this with our 6 meter converter advertised in VHF Horizons.

VANGUARD ELECTRONIC LABS Dept. V-7
190-48—99th Ave. Hollis 23, N.Y.

Vital Happenings & Facts

OPERATING AND DX NEWS

WHAT DO WE HAVE TO SAY?

Remember of two articles on Sporadic E skip and two meters? One ran last fall under our own pen, another ran in conjunction with W8KAY who provided the raw data we worked from.

We added in such reports as our being heard during the June 1962 contest (VHF QSO PARTY) by K41XC in Melbourne, Florida, and we promised to be on the air if it happened again this year.

At press time it has happened twice. We were there both times. **Where were you?**

JUNE 2

Six has been open most of the afternoon. Around 1900 we started hearing a brace of signals from western Tennessee here in Oklahoma City, and soon found central Arkansas stations coming through. We promptly went to two meters. The time was about 1915 CST, or 2015 EST. We apparently were too early.

For K4IXC, Melborne, Florida writes ". . . Remember sometime ago I wrote and told you that I had heard your two meter signals (June QSO Party, 1962) here in Melbourne? Well, it has happened again. Only this time I heard W9UNN/Ø, Wichita, Kansas. The time was 2227 EST (2127 CST) and his frequency was just near mine of 144.091. I heard a carrier start to build out of the noise, and when it got up there I switched off the BFO and heard W9UNN/Ø calling CQ Two Meter Phone. He built to well over S9 and lasted until he was about to sign, then faded down and out. This signal was also heard by W4MNT, Orlando, and W4VTJ Lantana. We all called but he was gone."

Let's check the W5KHT log for that approximate period. When I switched to two meters at 1915 CST (2015 EST) I immediately heard a station **I Read** as W8WAQ, rag chewing on about 144.105. He was in with a carrier (only read his phone at the beginning) from 1915 or so through 2005 CST. I also heard fading Es type carriers at 144.175, 144.090 and 144.015, between 1930 and 1955 CST.

I got Russ, W5HCX, on calling CQ with his KW on 144.205 and 40 element array from 1930 to 2000. He heard nothing.

We both shut down by 2105 CST, **before** K4IXV heard the signal on W9UNN/Ø.

What was six doing at this time? By 1945 CST the Arkansas short skip stations were gone, but they were replaced with some tremendously strong (and deep fading) signals from South Carolina, Georgia.

They lasted until around 2200 CST (2300 EST).

JUNE 9

This was a week later, the Sunday of the contest. We found six shortening up to Little Rock, Arkansas; Louisiana; Mississippi (all 300 to 500 miles) around 0820 CST. We immediately fired up on 144.140 (our contest frequency) as well as calling a QST-QST on 50 megacycles alerting the gang that two meters was possibly open between the midwest and Georgia — the Carolinas and Florida.

Several of the 4's apparently went to two meters. We heard two carriers come up and go down, and then at 0850 CST CO2DL, Arnaldo Coro, gave us a call on six meters to report he was copying our **two meter signal** in Havana. Arnaldo is a dyed in the wool VHF enthusiast and while he has no two meter transmitting gear, he does have a complete receiving lash-up from six meters up through all of the TV channels, FM band, aircraft band, two meters, and into the TV channels again, in fact all the way to UHF TV (he's copied several stateside UHF television stations in Havana.) He gave us a run down on what we are saying and we had a cross

band of sorts between two and six for a few minutes, the best we could through separate operating positions for six and two that were separated by 12 feet. Then we bid him good bye and quickly announced two was for sure open, and where the devil were the 4's!

We finally gave up two meters around 0915 CST.

Oh, yes, Arnaldo reported he heard two other two meter phone signals, some one was giving us QRM on 144.140. Who ever it was was counting 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and then back down to 1 again. Guess you'll listen next time you spend a few minutes tuning your two meter rig, hey OM?

In spite of all of this encouragement, we are far from happy. There is simply not yet enough interest in two meter Es to make it work. Next year we will have a 500 watt CW keyer beacon running whenever we hear a remote sign of six meter DX. And you'd better be listening and ready to transmit back to us!

SIX METER NEWS

Some of this will (unfortunately) be a little out of date when you receive and read this. However, on the chance some of the dates will be extended, we pass it along.

VP7CX, Harold of Bahamas fame, was to have operated on 50.040 as HI8XHL in the Dominican Republic from June 22 to July 2. This is his vacation. He asked that everyone keep QSO's to a bare minimum, i.e., RST, location and confirmation of contact, so as to allow him to work as many as possible.

Harold also has been active promoting more six meter activity in the Caribbean. He sent a complete six meter station down to VP2SY, on 50.060, on June 3. This would have been active by mid June, although we have no reports at press time.

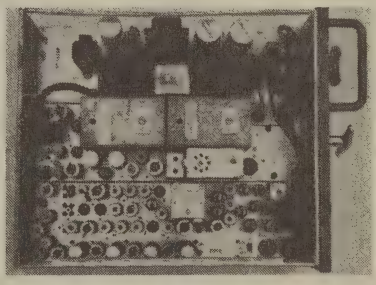
VP5BB, Barbados, is on 50.130 most of the time, when he is on. He has Lafayette's HE-45 so can move (VFO) if he thinks the going is too rough. Why isn't he in the foreign phone band?

VP9WB is on with a similar Lafayette product. Also on six meters in Bermuda is

FABULOUS LOW PRICES!

LOOK! PRICES SLASHED TO REDUCE HUGE WAREHOUSE STOCK!

450 Mc. Motorola T-44 50 watt Transmitter & Receiver. Complete with all accessories. 6/12 v. power supply. Con verts easily to A.C. Gets away from TVI and ignition noise. Special price! **$55**



MOTOROLA 6 METER AND 2 METER 60 WATT UNITS

Commercial two-way transmitter, receiver, power supply. A wonderful unit for ham conversion.

SPECIAL! **$35**

Complete set of accessories, just $10. Some units as low as $20.

Prices F.O.B. Chesterton

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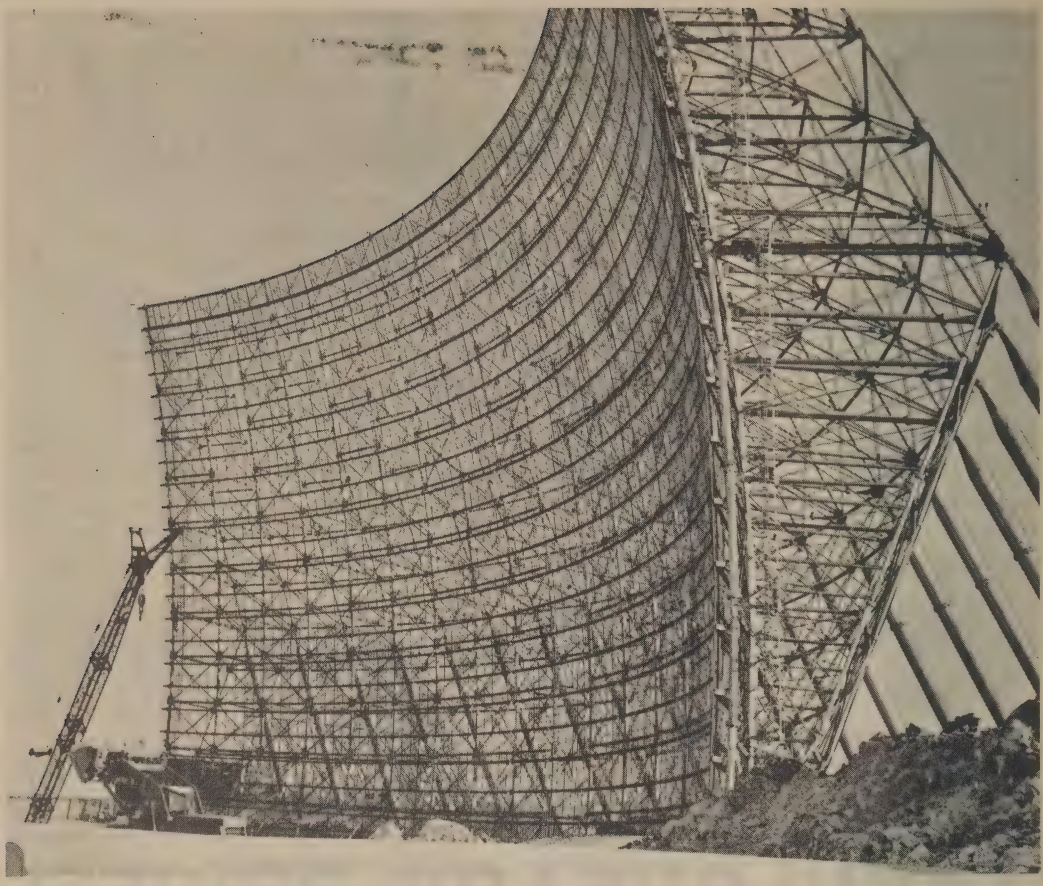


RUMOR has it Sam and the gang at W1BU have something cooking in the tropo scatter department for 432. A wandering sole who admits he was lost and says he wouldn't know a Massachusett's swamp from a Louisiana mud hole claims he snapped this snapshot someplace in the northeast. We take no credit for this news scoop. We leave that to Sam and QST.

K4PGL/VP9, who was worked on double Es by W5SFW on June 2.

KV4CQ will not be active from Virgin Isles until after mid August. Too bad. He's a W2 who vacations down there, east of Puerto Rico.

Speaking of east of Puerto Rico, FG7XT, Guadalupe, was worked by W5KHT from Oklahoma on June 1. He has Clegg gear (Zeus and Interceptor) and operates just outside US band (50.096) most of the time. His signal has a little instability, probably due to the line voltage regulation problem down there.

FP8CA and FP8CB were supposed to have been active from St. Pierre on six and two during the contest. Clegg gear. No reports on this one, did they make it?

CO2DL, Arnaldo, is pretty active on six. His name is Arnaldo Coro, Havana is his QTH. If you are interested in Es and propagation topics, call him and spend 90 minutes rag chewing with him like we did June 2. A most interesting chap who notes "we now use Russian or Chinese People's Republic tubes and components in all of our gear since we can't get American parts any more."

Rumor has it a TI2R? has been active. XE10E in Mexico City was supposed to know his call and frequency, but Ted said he had no such knowledge when we worked him on June 9.

Two KP4's were supposed to have worked YV5's in Venezuela on June 1. We know nothing definite about this.

VP4ZN was heard being worked by two K6 stations on June 1, on CW (!).

VP7CX was to be on two meters during

the June contest. His frequency was to be 144.450. CW. Anyone work him?

KB6CL/H6, is supposed to be on 50.102 with a gallon on SSB at 2200 CST nightly, according to 5WSFW. No reports on KH6 contacts so far this year, nor any reports on any KL7 activity.

VP7CX heard a Seattle station on SSB on May 31. Who was the 7 station that missed a Bahamas contact?

Contest Report

We should really wait until next month since we haven't had time to gather adefared best on E skip apparently were the fellows in W4 and W8 land. Sunday was a real bang up day until mid-afternoon.

Here at W5KHT, we held down the fort with W5ORH, K2JWE/5 and myself, W5KHT. W5HCX, Russ, was in Seattle attending a television conference for one of the books he edits.

We pulled a sneak test by running two rigs on six meters simultaneously.

One was the KW on the low end, AM, CW, or SSB, the other was a 100 watter on AM which stayed above 50.3. This gave us a chance to work an extra hundred plus contacts above 50.300, and it worked so well (after we engineered out the cross modulation and overload) that we plan to really do it up right with kw's on both ends of the band next year, **unless** the League decides this is not a kosher way to do things. As far as we could determine, there is nothing preventing two rigs per band at this time, in the rules. Makes life mighty interesting for the logging man, I can tell you that!

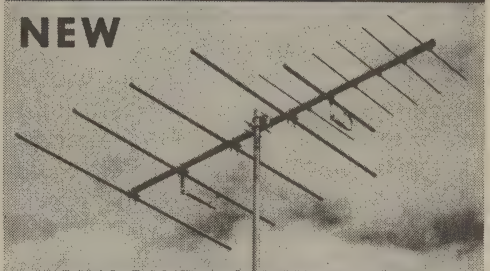
We ran closed loop television between the two operating positions and the logging desk, and the logger (and record keeper) had to keep up with two operators.

He had a return audio loop to advise either of the operators when the station being called or about to be heard had already been worked. It worked fine.

The band conditions were not as good as 1962. We managed to work 512 contacts in 54 sections, for a total score of 27,650. But wait until next year! We have some real plans for 6,2,220,432 1296. **Watch out you eastern multi-op stations. W5KHT is about to strike!**

REALIZE MAXIMUM SIGNAL POTENTIAL

NEW



DUAL BAND 6 & 2 METER BEAM

A combination 4 element 6 meter and 6 element 2 meter beam on one 12' x 1¼" .058 wall aluminum boom. Two meter elements are preassembled on the boom. 6 meter elements are marked for quick neat assembly. Weighs only 11 lbs. Complete instructions supplied. Uses two separate 52 or 72 ohm feed lines. $27.50

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Model ABW-420	1 bay, ¾ meter	$8.95
Model ABW-220	1 bay, 1¼ meter	10.95
Model ABW-144	1 bay, 2 meter	12.95

VHF BEAMS

Rugged, lightweight, and real performers. Booms, 1" diameter aluminum tubing elements 3/16" diameter aluminum rod preassembled on booms. Transformer dipole or Reddi Match. Dual and Quad Arrays available.

Model A144-11	11 element, 2 meter, boom 12'	$12.75
Model A144- 7	7 element, 2 meter, boom 8'	8.85
Model A220-11	11 element, 1¼ meter, boom 8.5'	9.95
Model A430-11	11 element, ¾ meter, boom 5'	7.75

6 METER BEAMS

Full size, wide spaced, booms 1¼" and 1½" diameter, elements ¾" diameter aluminum tubing. Reddi Match for direct 52 ohm feed 1:1 SWR.

Model A50-3	3 element, 6 meter, boom 6'	$13.95
Model A50-5	5 element, 6 meter, boom 12'	$19.60
Model A50-6	6 element, 6 meter, boom 20'	32.50
Model A50-10	10 element, 6 meter, boom 24'	49.50
Model A50-3P	Portable 3 element, 50" x 4" folded	10.95

VHF MOBILE HALOS

Aluminum construction; machined hardware; Reddi Match for 52 or 72 ohm direct feed. 2 meter. Dual halo two bands one 52 ohm feed line.

Model AM-2M	2 meter, with mast.	$8.70
Model AM-22	2 meter, stacked Complete	14.95
Model AM-6M	6 meter, with mast.	12.50
Model AM-26	6 and 2 dual halo, with mast	17.45

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Model CL-116	2 meter, 16 element colinear.	$16.00
Model CL-216	1¼ meter, 16 element colinear.	12.85
Model CL-416	¾ meter, 16 element colinear.	9.85
Model CL-MS	Universal matching stub matches 300 ohm 16 element antennas to 200, 52, or 72 ohm feed lines.	4.75

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SSB Picture

Last month we promised a run down on six meter SSB conditions. We have an announcement from the East Coast VHF Single Sideband Association. At their quarterly Dinner Meeting, their outgoing President John Super, K2ZBX, presented the group with a large and attractive trophy, which is in turn to be given (awarded) to the first amateur to work all states in the continental 48 on VHF SSB. This means the first fellow to make the grade on six meter SSB is going to receive a most well deserved trophy for his feat. This now puts real emphasis into what all of us sidebanders have been working for!

The custodian for the trophy is Abe Cutler, WA2ONB. This is the first such trophy to be offered, as an award for VHF sideband work, and we feel it will be both an extreme honor privilege to earn same. The East Coast VHF gang is to be congratulated for their efforts in this area.

Oh yes, the East Coast sideband gang meets on 50.108 Sundays at 1100 hours EDT (this summer).

Now to those rare states on sideband.

Still no word on Maine, Vermont, New Hampshire, Connecticut sideband activity. Guess there is none. Arkansas is also apparently a void. (See list of states in June VHF) North Dakota ditto.

In Utah, we have definite conformation that no one is active. **Sorry Charlie.**

In Nevada, you can get K7ICW in Las Vegas to go SSB if you get ahold of him (name is Al) on CW (or phone, although he preferes CW) first. We did it early in June one night (June 2nd). Also about to get active on six meter SSB from Nevada are K7HRW and K17LB in Reno who are working together on companion mixer units. K7HRW will be on with a full gallon.

Oregon? K7IMH was worked by the Horizons gang on SSB on June 9th during the contest. He's good for a QSL too.

Idaho? Apparently no one there, yet, since W7UBI left last year.

The rest of the states are reported to be represented by varying amounts of activity, although we personally have quite a few left to work, especially in the Nebraska-Wisconsin-South Dakota area.

It appears that we have **never** had SSB activity on six from the states of Maine, Vermont, Arkansas, Utah or North Dakota. Anyone know any different? It will help us plan how hard we have to work to beat someone else to the East Coast VHF gang trophy.

General News

We'll dispense with the band by land listings this issue for two reasons. I'm writing this just hours before I personally head on a ten day trip into the west coast, and it's still four hours before the VHF contest folds up. Time being of the essence, we want to hit the highlights the hardest and leave the details to the other magazines.

W7GJL, Barbara Ashley, Secretary of the **Northwest Amateur Radio Communications System, Inc.** of Washington state advises they are opposed to Wayne Green's (73 magazine) proposal to take the upper IMC of six meters (in particular) in favor of amateur television. The Washington group says they feel that the number of people who would utilize restricted bandwidth amatuer television on six is small when compared to the number of people now using the upper megacycle for FM work.

They would like to see other groups voice their opinions to the FCC.

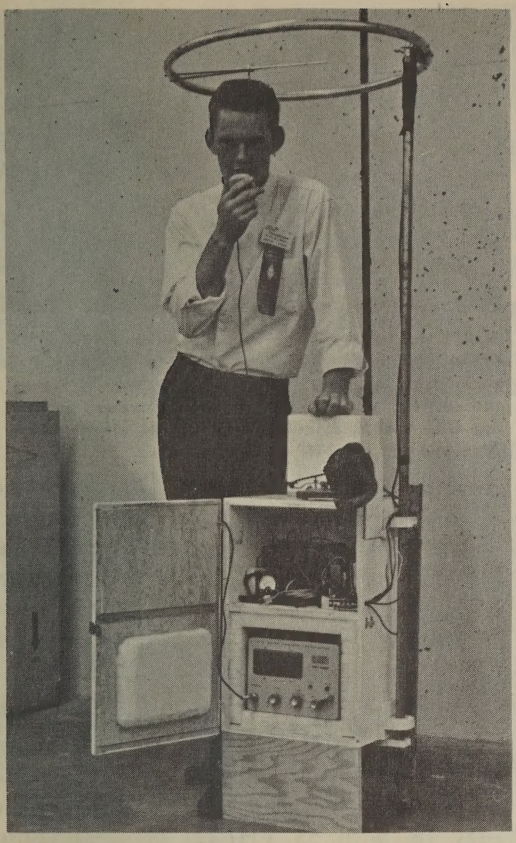
K1AGG, Phoenix, is another fellow hot for two meter DX work, especially Es. He has a habit of operating on 144.025 plus or minus a little bit and is apparently well enough equipped to make the grade when the band is hot. He tunes the lower 100 kc on two meters.

WA4ISG advises that if you worked VP9WB, he should get his QSL's in care of KØORH.

VE3BRI, Woodstock, Ontario has two 13 element yagis put together for 432 megacycles. Watch for him. The beams are silver plated ala that nut W9JFP (hi-Vic).

Dozens of stations report dobule hop Es during the month. We would like to acknowledge all of them here, but simply don't have the space. Your material will be fed into Univac gents, and it all helps.

K6QKL/KH6 advises he is monitoring 50.110 upper sideband 24 hours a day from Honolulu. He heard South American signals



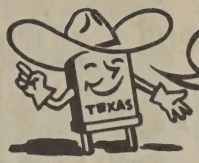
LAST YEAR IN PORTLAND at the ARRL National, we caught this young lad (I believe from Seattle) with his complete walking-portable six meter station. A Sixer, voice operated mike (through a headset) or the more conventional hand held mike, halo, and 12 volt battery. Straps on the back on the rig allowed him to haul its 40 pounds around the convention floor. Ah to be young again!

at 2210 GMT on May 13. He believes the reception was due to ionized trail sleft by a Pacific Missile Range launch.

WA6HIT/AD6HIT reports a 432 megacycle MARS net in the Los Angeles area. It's Sixth Army MARS, every Saturday morning at 1600 GMT, and Sunday mornings at 1500 GMT. They have 20 members and average 10 check ins per session. 1296 operation is contemplated. Sounds unique.

Ralph Metro, WA2SVD asks for any information on the R-449 receiver, as discussed in a past issue of VHF. Can anyone help, with where to get such an animal?

OK2-4511, Josef Menda, Olsany, Ruda nad Moravou, Czechoslovakia writes he enjoys very much VHF Horizons but is having trouble getting the necessary financial exchanges worked out to get his sub current.



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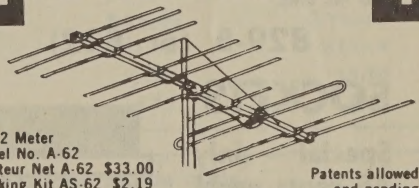

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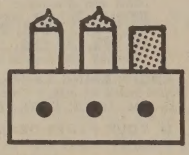

Our version of the 220 mc low power rig described in this issue of VHF. Complete with modulator, RF deck. You supply three tubes and crystal, filament and B plus and you're on the air with 2 watts! Price just $18.00. We will supply the rig with xtal and three tubes for $25.00.

OR, 3.5 watts out on six meters. Same ultraminiature unit fits in palm of your hand. These units have real modulation punch! Same prices, with or without tubes, as with 220 mc unit.

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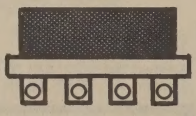

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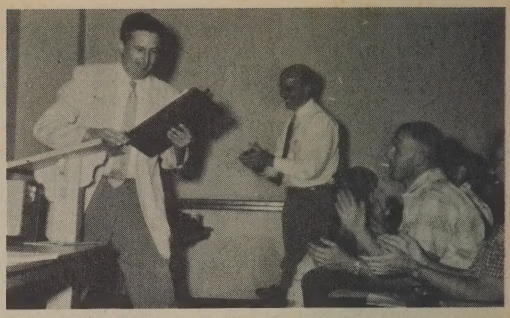


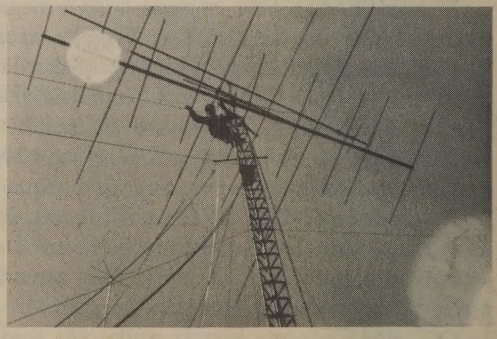
SORRY to have missed attending the Fresno VHF Whing-Ding in May. This shows two of the principal participants in a past such meet; Alan, W6FZA, leaves the rostrum while wildly enthusistic crowd (including Gib, W6BJI, standing) applaud his efforts. Both Alan and Gib are VHF staff members.

Anyone want to see a worthy European receive VHF monthly? $5.00 per year foreign.

K5DRF reports he worked XE1CT in Mexico City, on 50.125, with 3 watts input on May 31. Who says you need power!

K7DTS, Napavine, Washington reports FM DX on 53.29 megacycles when he heard W7FXJ/6 in Bakersfield, California for 3½ hours on May 9.

W6GDO, Rio Linda, California reports on attending the VHF hamfest in Fresno on May 18, with 53 VHF'ers present. Those who appeared included K7AAD, Loren Parks of Electronics, who spoke on VHF converter design. 18 of the 53 there indicated VHF-UHF current activity, in this fashion: 6 on 6 SSB; 18 on 2 SSB; 12 on 220; 5 on 432; 7 on 1296! W6DNG played his moonbounce tapes (wow!) and K6UQH and VHF Staffer W6BJI talked on Paramps.



BILL KAMP, WA9DML, perches 100 feet up on the tower at W9JFP. Bottom to top, 9 elements on 50 mc/s, test beam for 432 (15 elements on 14 foot boom), TH-4 Tri-bander, 15 element two meter array. The big 432 antenna broke in two on the way up. Vic has nothing but troubles and money.

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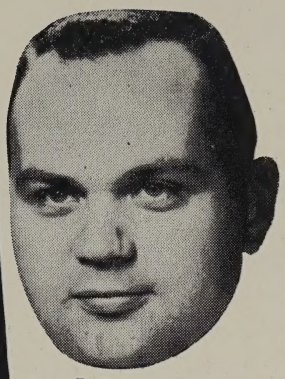
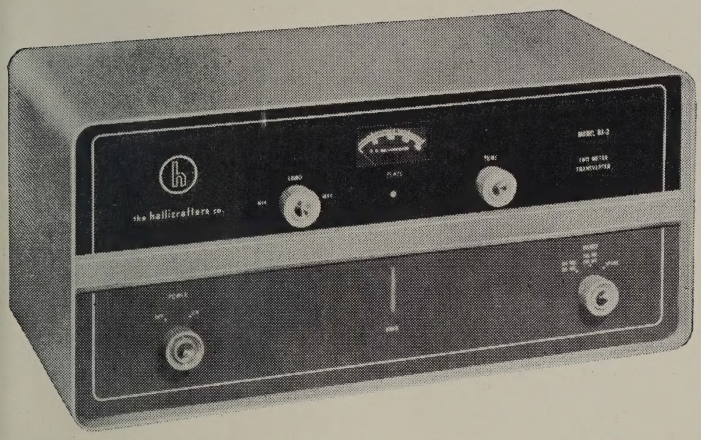


Terry—
W9DIA



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